

ABSTRACT

Aflatoxins, naturally occurring carcinogenic toxins produced by species of fungi, *Aspergillus flavus* and *Aspergillus parasiticus*, are associated with poor growth outcomes, especially stunting and underweight as well as morbidity in young children. Although evidence supports mother to infant exposure during pregnancy and breastfeeding, evidence of its effect on growth is limited to the period after introduction of complementary foods. It is therefore unclear whether early maternal exposure to aflatoxin affects infant growth and morbidity right from birth. Prevalence of aflatoxin levels of 40% has been observed in Nyanza region, and 22.7% of children under 5 years are stunted. The purpose of this study was to determine effect of maternal aflatoxin exposure on growth and morbidity of infants 0-3 months old in Kisumu County, Kenya. Specific objectives were to: determine aflatoxin contamination levels in selected common foods (maize, sorghum, cassava, groundnuts, rice, omena and milk); assess aflatoxin exposure in pregnant women; assess the effect of maternal aflatoxin exposure on infant growth indicators (length, weight, WLZ, WAZ, and LAZ); assess the effect of maternal aflatoxin exposure on infant morbidity. In a cross sectional survey, 297 solid food samples selected by a combination of cluster and systematic sampling; and 80 milk samples selected using the European model from market outlets were analyzed for aflatoxin contamination in June-August, 2013. Out of 730 potential participants, 553 pregnant women were screened for aflatoxin exposure. Of these, 137 exposed and 137 non-exposed women, matched for age and household income, participated in an 8-month cohort study. The women were followed up to delivery and their infants up to 3 months after delivery. Infant length and weight data was collected monthly and morbidity data fortnightly for 3 months. Length-for-age (LAZ), weight-for-length (WLZ) and weight-for-age (WAZ) were generated. Aflatoxin levels were analyzed using Enzyme Linked Immunosorbent Assay (ELISA) in parts per billion (ppb). Women consuming foods with aflatoxin levels above 10 ppb were considered exposed. Effects of aflatoxin on infant growth outcomes were assessed using multivariate linear and logistic regression. Effect of maternal aflatoxin exposure on infant length, weight, LAZ, WLZ, WAZ and morbidity was determined using Cox regression with constant time at risk. Aflatoxin B₁ and M₁ levels in market foods ranged between 0 ppb to 34.5 ppb and 0.012 ppb to 0.127 ppb respectively. Sorghum had the highest aflatoxin median levels (median=14.2; IQR= (8.5-19)). Women exposed to aflatoxin levels above 10 ppb were 24.8%. Weight (95% CI:-0.85,-0.53), length (95% CI: -4.08, -3.36), LAZ (95% CI: -1.93, -1.16) and WAZ (95% CI:-1.03, -0.54) were lower in infants of exposed women at 3 months of age, but there was no difference in WLZ (95% CI:-0.03, 0.74). Risk for stunting was higher in infants of exposed women (RR=4.08; 95% CI: 1.35, 12.29). There was no difference in the risk for underweight (RR=6.61; 95% CI: 0.80-54.33) and wasting (RR=0.37; 95% CI: 0.40, 3.39, P=0.38). Risk of malaria (RR= 2.04; 95% CI: 1.05, 3.99) and diarrhea (RR=4.13; 95% CI: 1.16, 14.76) was higher in infants of exposed women. Infants of women exposed to aflatoxin are at risk of stunting, malaria and diarrhea. These results underpin the need to reduce aflatoxin exposure in infants and young children who are very vulnerable.