Researchers
Vivian Hoffmann
International Food Policy Research Institute (IFPRI)

Kelly Jones
American University

Staff
Aflatoxin Exposure and Child Stunting in Kenya

Claudia Casarotto
Chief Global Programs Officer

Lulu Tian
Research Associate

Rachel Steinacher
Director, Business Development

Timeline
2013-2016

Sample Size
71 villages

Research Implemented by IPA
Yes

Aflatoxin Exposure and Child Stunting in Kenya

Abstract

Child stunting has been associated with exposure to aflatoxin, a toxin produced by a fungus that affects crops such as maize, groundnuts, and sorghum. However, the causal relationship between aflatoxin exposure and height-for-age child growth has not been demonstrated. This project seeks to reduce exposure of aflatoxin through a maize-testing and swapping program, while assessing the effects of post-harvest and storage technologies, which may reduce aflatoxin contamination in home-produced maize.

Policy Issue

Aflatoxin is a toxin produced by the *Aspergillus* species of fungus. It is present in a variety of crops and animal products, though the consumption of maize and groundnuts is the most common source of exposure worldwide. Chronic consumption can cause cancer of the liver, and consumption in large quantities may cause aflatoxicosis, which is fatal. What is not known is the impacts of chronic exposure on child growth. While a few studies have found some association between aflatoxin exposure and child stunting, these studies were not randomized evaluations and results remain inconclusive. This research aims, therefore, to provide rigorous evidence on the causal relationship between aflatoxin exposure and child growth.

Context of the Evaluation

While developed countries have largely removed the risk of aflatoxin contamination from the human food supply through the use of modern drying and storage systems and routine testing, exposure remains a risk in many developing countries where maize is the staple food. More than 1.2 billion people in Sub-Saharan Africa and Latin America rely on maize as a staple crop. In Kenya, maize is the staple for 96 percent of the country's 40 million people,[1] and is the primary source of aflatoxin exposure.

This project is taking place in Meru and Tharaka-Nithi counties in eastern Kenya. High levels of both child stunting and aflatoxin exposure have been found in this region making it an appropriate site to study whether reducing aflatoxin exposure will improve child growth.

Details of the Intervention

This project attempts to removed aflatoxin-contaminated maize from the diet of young children in eastern Kenya and evaluates the impact that reduced exposure has on child growth. This project also identifies and promotes improved post-harvest and storage technologies and evaluates the impact on aflatoxin contamination of smallholder farmers' maize. The study is taking place across 71 villages in Meru County and Tharaka-Nithi county in eastern Kenya.

The villages are randomly assigned to one of two treatment groups or a comparison group. The first treatment group is designed to examine the effects of improved post-harvest and storage practices on aflatoxin levels in maize stores. Households in this group will receive intensive training regarding the hazards of aflatoxin consumption, how maize and other crops become infected with aflatoxin, and which storage and post-harvest techniques can reduce aflatoxin levels in their food stores.[2] Farmers in these households will also be given access to significantly discounted improved maize drying and storage equipment throughout the harvest season.

The second treatment group is designed to examine whether aflatoxin exposure impacts height-for-age child growth. Households in this group will be able to buy certified aflatoxin-safe maize provided by the study via a local stockist.[3] They will also be offered testing of their household maize stores at least every two months over a period of two years, and will be given the opportunity to switch out any aflatoxin-contaminated maize for aflatoxin-safe maize. The linear growth of children born during the study period in these households will be compared to growth of those in the comparison group. Blood samples and measurements are collected from pregnant mothers at baseline, while child blood sample and measurements will be collected during endline. Blood sera will be analyzed for a biomarker indicating recent exposure to aflatoxin.

At the conclusion of the intervention, study results will be reported back to all villages; the research team will provide information regarding the most successful post-harvest and storage techniques, as well as the cost of those techniques.

Results and Policy Lessons

Results forthcoming.

Sources

1. Liu, Y. and F. Wu. (2010). Global Burden of Aflatoxin-Induced Hepatocellular Carcinoma: A Risk Assessment. *Environmental Health Perspectives*. 118(6): 818–824.

2. Given the known health effects of aflatoxin exposure, an intervention benefitting only a subset of study households would raise ethical issues. The research team is therefore providing information on how to reduce aflatoxin exposure to all study households, both those in the intervention group and those in the comparison group.

3. Aflatoxin-safe maize is contaminated at a rate below 10ppb, the government-designated threshold safe for human consumption.

February 11, 2015