Headey D, Hirvonen K. **Is exposure to poultry harmful to child nutrition? An observational analysis for rural Ethiopia.** PLoS ONE. 2016 Aug 16; 11(8):e0160590. Doi: 10.1371/journal.pone.0160590.

Introduction

Child undernutrition remains a major public health concern worldwide especially in low-income countries (1), and is the consequence of complex interactions between household (HH) socio-economic status, child feeding practices, health care and environmental factors (2). In Ethiopia, as in many other low-income countries, supporting livestock ownership is one possible strategy to prevent undernutrition, as evidence has suggested that owning livestock may benefit children's growth by providing greater access to animal-source foods (ASFs) (3). However, greater exposure to livestock, especially poultry and their feces, may also be associated with an increased risk of diarrheal diseases, environmental enteric dysfunction (EED) and respiratory diseases (4), which can negatively affect children's growth (5).

The current issue of NNA summarizes an observational study conducted in rural Ethiopia that was recently published in PLoS ONE (6). The objective of the study was to test the hypothesis that owning poultry may be positively associated with child growth through increased egg consumption, but may be negatively associated with growth because of elevated exposure to pathogens transmitted by livestock.

Methods

The study used household survey data collected from June to July 2015 in the five largest regions of Ethiopia. The survey was administered to 6,977 households (HHs) in 252 villages in 84 of Ethiopia's 670 rural districts. Detailed information on agricultural production was linked to both children's anthropometry and reported food intake in the previous 24 hours. For the current study, a total of 3,494 preschool children 0-59 months of age from 2,704 HHs were assessed for anthropometry and dietary diversity. Height or height-for-age Z-score (HAZ) was defined according to the World Health Organization 2006 Child Growth Standards. Mothers were interviewed regarding child feeding practices, children's consumption of ASFs such as dairy products and eggs, over the previous 24 hours and socio-economic status (household asset index, housing characteristics, level of education, farm sizes, and ownership of agricultural equipment), access to improved water source, and use of toilets. Information was recorded on the different types of livestock owned by the household and whether these animals were kept inside the residential portion of the house. Least squares regression analysis was used to estimate unadjusted and adjusted associations between livestock ownership and child nutrition, controlling for potentially confounding factors, such as socio-economic status, agricultural, water and sanitation, health and dietary practices.

Results and conclusions

In rural Ethiopia, around half of the HHs owned poultry, 42% owned pack animals and 66% owned calves/heifers. HHs that did not own poultry were more likely to be poor and to be less educated. Among the poultry owners, 48% reported keeping their poultry inside the main house overnight. HHs that kept poultry inside their houses were also more likely to keep other animals

inside.

Of the 3494 children assessed (mean age 33.5 months), 48.4% were stunted (HAZ<-2SD). Poultry ownership was positively associated with child growth. However, among HHs that kept poultry inside the residential portion of the house, children were more likely to be stunted compared to children in HHs that kept poultry outside (50% vs 44%), even after controlling for education, land size, assets, toilet use, nutritional knowledge, child age and sex. In fact, results suggested that keeping poultry in close proximity to children could eliminate the potential beneficial impact of poultry ownership on growth. Poultry ownership was associated with increased egg consumption by children, but not consumption of other ASFs, such as meat or dairy products, and the authors concluded that may be causally related to increased child growth.

Results of the study suggest that the association between poultry ownership and child growth may be modified by children's proximity to poultry and related environmental contamination. However, caution should be taken regarding the interpretation of these results, as the associations reported are derived from an exploratory analysis of observational data and the children's proximity to poultry was only a proxy of the exposure to fecal matter from poultry.

Policy implications

Findings from this study suggest that small livestock interventions aiming to improve children's nutritional status should also focus on ensuring HH hygiene knowledge and on reducing children's exposure to poultry and their feces. To optimize potential synergies, the authors suggest that a multisectoral approach building on health, nutrition, agriculture and WASH interventions may lead to greater success in reducing childhood undernutrition than any single intervention.

NNA Editor's Comments

Targeted agricultural interventions can affect nutrition through several pathways (7); as a source food, a source of income, through improving women's social status and empowerment, and by improving women's health and nutrition. These are key mediators in the pathway between agriculture and children's nutrition (7).
Any agricultural intervention, such as a small livestock program, should be accompanied by a strong behavior change communication strategy to promote an intra-household distribution that ensures the consumption of eggs by children and, as suggested by the present analysis, to avoid children's direct exposure to poultry and their feces.

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