

## Editorial

# Relationships between Weaning Food Preparation and the Transmission of Parasitic Infections among Children in Honduras, El Salvador and the Dominican Republic

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Received: June 03, 2015; Accepted: June 08, 2015;

Published: June 09, 2015

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In two of our published studies on the prevalence of gastrointestinal parasites in children from Verón, a rural city of the Dominican Republic, we found that 127 of 128 fecal samples examined from children ranging from 2-15 years were positive for one or more parasites. Parasite infection rates were 43.8% for *Ascaris lumbricoides*, 8.5% for *Enterobius vermicularis*, 21.1% for *Entamoeba histolytica*, and 22.7% for *Giardia intestinalis*. Of the children examined, 7.8% had double infections [1,2]. We determined that plans of action to reduce gastrointestinal parasites in children will require a determined effort between international, national and local health authorities combined with improved education for school personnel, child care providers, food handlers and agricultural workers as well as to define what infants eat when weaned from breast milk to solid foods [2].

To date, there are no extensive published reports on the weaning foods used in the Dominican Republic or how weaning foods are prepared. Contaminated weaning foods may be responsible for the introduction of a substantial portion of parasite-induced diarrheal diseases among infants and young children in Central America [3,4].

From November 2014 through February 2015, the Department of Microbiology, Infectious and Emerging Diseases, Edward via College of Osteopathic Medicine, conducted a preliminary 3 month-long study in Honduras where 175 mothers were extensively interviewed. Presently, we are expanding this study to include the survey of mothers and caregivers in El Salvador and the Dominican Republic. The purpose of this year-long study is to investigate breastfeeding and weaning practices used by mothers when transitioning infants from breast milk to solid foods. This involves determining when weaning foods are introduced into the infant diet and how weaning foods are prepared.

Results of the preliminary data collected by the second author from the Honduran mothers are as follows.

**Breastfeeding and Supplemental Formula:** Eighty nine Honduran mothers were surveyed during November and December, 2014. The average number of children per household was 3.6, ranging from one to ten children. On average, mothers who breastfed their infants did so exclusively for three to four months before supplementing with formula or other liquids. Of the seventy eight mothers who fed their infants formula, seventy six used a dried powder mixture. Of these mothers, 96% prepared the formula using water that had been boiled and cooled. Two mothers prepared the dried formula using bottled water and one used chlorinated water.

**Addition of Liquids to the Infant's Diet:** The average age at which mothers added other liquids to the infant's diet was six months. Some of the mother's surveyed started their children on other liquids on the first day of life. The most common added liquid was fruit juice (95%), followed by water that had been boiled and then cooled (80%). Three of the mothers surveyed said they did not supply their infant with water during the weaning process. Of eighty nine mothers surveyed, 40% reported giving their infant cow's milk while 35% fed their infants coffee. Only 22% of those surveyed said they gave their infants soda.

**Addition of Foods to the Infant's Diet:** The average age that mothers added solid foods to their infant's diet was six months old. Fruits were the most common food to be given to infants, with 93% of mother's feeding their infant fruit during the weaning process. Weaning foods including vegetables were commonly used by 91% of the mothers. Meats and grains were given by 66% and 65% of mothers respectively during the weaning time period. Each mother surveyed stated that the foods given to their infants during the weaning process were the same foods fed to the rest of the family; 94% pureed the food before giving it to the infant while 16% mixed the food with water during preparation. Nutritional supplements were given to 43% of the infants by the mothers surveyed.

**Completion of the Weaning Process:** According to the mothers surveyed in this study, the average age at which children were completely weaned off milk was two years and four months. The youngest age at which a child was completely weaned was three months. Of the infants that were full weaned at three months, one of the three infants was infected by a gastrointestinal parasite. The maximum age a child was still found to be breast feeding was 13 years old. 5.

**Parasitic Infections among Children:** Only one mother interviewed did not report her children to be infected with parasites. Of those surveyed, 98.9% of mothers reported at least one of their children being infected with a gastrointestinal parasite. Out of the 322 children of the mothers surveyed, 42% had been previously diagnosed with a gastrointestinal parasitic infection. The highest infection rate

per household was six of seven children. The average age when the child was diagnosed with a parasitic infection was two years old. The youngest age that a child was infected was three months old while the oldest was ten years. The above data concerning the prevalence of parasitic infection in the children in Honduras is consistent with that reported in 2014 in the Dominican Republic in a separate study by two of the authors, Childers and Palmieri.

Parasitic infections and diarrheal diseases contribute to under-nutrition and general vulnerability in a disproportionate number of infants and children particularly in regions of Central America experiencing extreme health disparities, i.e., in El Salvador, the Dominican Republic and Honduras [5-10]. It is critical that a detailed study be designed to determine what weaning foods are utilized by mothers and caregivers, how these foods are prepared, the source of water used to prepare weaning foods and the overall understanding of disease transmission by those who prepare and handle weaning foods. Mothers will be asked what foods they used during the weaning of their infants, at what age were infants weaned, and how weaning foods were prepared. We will relate this information to transmission phases of parasite lifecycles known to affect children in these areas. Data will provide information needed to produce a standard of practice guide for the safe introduction of weaning foods. This guide will be developed collaboratively to promote the use of safely prepared, age appropriate and nutritionally beneficial weaning foods. The guide will be used to educate mothers, school personnel, child care providers, health care workers, food handlers and agricultural workers. The data and educational materials produced will be shared with existing government supported nutrition programs,

breastfeeding promotion campaigns, and health care policy makers to reduce parasitic infections in young children and to promote better nutrition and hygiene practices among women and children.

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