Gender and Food Safety Research to Improve Quality of Baby Foods in Tanzania

Worldwide, millions of children age 6-24 months are exposed to foodborne pathogens when complementary (baby) foods are introduced to their diets. In Tanzania alone, 1.3 million children in this age group suffer from diarrhea, leading to stunting and often death. Mothers and caregivers play a critical role in ensuring the safety of complimentary diets and therefore benefit from having sufficient knowledge of everyday food safety practices.

The Ohio State University (OSU) has worked together with Sokoine University of Agriculture (SUA) through the USAID-funded Innovative Agricultural Research Initiative (iAGRI) to improve microbial quality of homemade baby foods in Tanzania. In 2016, an iAGRI-supported study conducted by Tanzanian graduate student Joan Msuya examined food safety behaviors and knowledge among mothers/caregivers of children aged 6-24 months in Tanzania to determine the risk of the microbial contamination associated with the presence of human pathogens in homemade baby foods. Joan completed this study as part of her M.S. thesis research at OSU under the direction of Dr. Sanja Ilic, OSU's College of Education and Human Ecology, in collaboration with Dr. Joyce Kinabo at SUA's Department of Food Technology, Nutrition, and Consumer Sciences.

Food preparation in front of the household in Mwembesongo, Morogoro Region

The study began in December 2015, with the research team consisting of Joan and Drs. Ilic and Kinabo engaged 289 mothers and caregivers in eight low socio-economic income wards of Mwembesongo, Mafisa, Chamwino, Mafiga, Kingolwira, Kichangani, Mjimpya and Kauzeni in the Morogoro Region, Morogoro, Tanzania. A portion of the participating women were recruited through the Mwanzo Bora Nutrition Program (MBNP) aimed at reducing maternal anemia and childhood stunting in Tanzania by using Social Behavior Change Communication (SBCC) that focuses on the first 1000 days of the child's life, from conception up to the child's second birthday.

"The community response throughout the study was remarkable and women were quite willing to participate when researchers visited their households," describes Dr. Ilic, who specializes in pathogen transmission and dissemination routes, as well as interventions to prevent and reduce risks of contamination of fresh produce and other foods.

Joan Msuya (center), Ohio State M.S. student, surveying women in Morogoro, Tanzania

During each visit, participating women completed surveys with the researchers and provided information about their children and households. They then completed a knowledge assessment based on an adapted version of the Five Keys to Safer Foods (WHO) tool, which was translated into Kiswahili. Scientists also conducted structured observations of the households to document practices and score food safety factors that could explain the quality of the foods prepared for the children and they collected baby food samples from each household for microbiological analysis in laboratories at SUA.

After looking at the socio-demographics of the mothers and caregivers interviewed, the scientists discovered that the majority of participating women were dedicated to their households and did not have formal employment (60%), making them an important population to target for food safety education. Most women were adults (27.7 ± 7 years old) and had completed elementary education (78%), which takes 7 years of formal education in Tanzania. Women who completed elementary school had significantly higher understanding of adequate cooking practices as defined by the research food safety knowledge tools employed. However, it was the level of education of their husbands that was the strongest positive predictor of higher scores in the five food safety topics investigated (i.e. cleanliness, separation of raw and cooked foods, cooking practices, safe storage and the use of safe water and raw food ingredients).

Nearly all of the sampled baby foods collected in the households (96%) had indicators of potentially harmful bacteria (so called coliforms), often associated with fecal contamination. The mean coliform counts were between 10,000 and 500,000 bacteria per gram of food, which is

much higher than the maximum limit of 100 bacteria per gram of baby food allowable in Tanzania. Understandably, such harmful coliform and more specifically *E. coli* bacteria were more abundant in foods from households with low personal hygiene scores, emphasizing the need for reinforcing handwashing education.

Further analysis of the data collected revealed that it will be important to promote good practices on hand hygiene and diaper handling, which will be challenging for practical implementation in households lacking potable water and clean areas designated as the household kitchens.

Families and children from surveyed households in Tanzania

Interestingly, this study illustrated the very important complementary role that male and female education play in the food safety quality of the diets intended for their children, with women playing a critical role in ensuring the safety and nutritional adequacy of baby food preparation and provision. The findings of this study are now being used to develop food safety interventions appropriate for low income mothers and caregivers in Tanzania in order to reduce the risks associated with homemade baby foods.

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Joan Msuya, an iAGRI-supported student, received her M.S. in Human Nutrition at The Ohio State University in 2016, under the advisement of Dr. Sanja Ilic, Assistant Professor in the College of Education and Human Ecology and State Food Safety Specialist, Ohio State Extension.

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