Summary of findings and recommendations

- It is possible to improve the quality of the diet provided to infants and young children using combinations of local foods.
- In this study, nutrition education led to an increase in the diversity of children's diets. This suggests that nutrition education needs to receive more attention as part of a nutrition behaviour strategy.
- While community health workers in Kenya as elsewhere are important for the outreach to individual community members, they lack knowledge on nutrition – training community health workers would be a very efficient way to spread important nutrition information.
- As increased nutrition knowledge was not found to have a direct and significant effect on children's dietary diversity score, there may be additional benefits to nutrition education, such as providing motivation to change practices.
- Further research is needed to test if nutrition education may be more effective when it is combined with other strategies that enhance accessibility to affordable, culturally acceptable and nutrient-dense foods, for example, when it is combined with agricultural activities.

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Background
Malnutrition among children under 5 years is still a widespread problem in many developing countries. Worldwide, approximately 162 million children under the age of 5 are stunted, in Kenya 35% of all children aged under 5 were stunted in 2008-2009 (Kenya Demographic and Health Survey).

While consuming a variety of foods is important for meeting essential nutrient requirements, traditional diets fed to children in many developing countries are based predominantly on starchy staples with few or no nutrient-rich foods such as fruits, vegetables and animal source foods. During feeding, infants and young children are often not encouraged to eat a sufficient amount and variety of foods which varies by age and breastfeeding status.

In addition, even when food resources are available in the household, caregivers might not make the best use of them due to lack of knowledge of the best foods for young children, cultural beliefs and practices, and inappropriate advice. Thus, lack of diversity next to inappropriate consistency, low nutrient density and quantity of food are major contributing factors to inadequate nutrient intake among infants and children during the complementary feeding period. This period is part of the first 1,000 days – from a woman's pregnancy through her child's 2nd birthday – that are key to the child's development and long term health. This lack of diversity has been attributed to poor dietary quality, feeding practices and nutrition knowledge among caregivers. Bioversity International and its partners conducted a series of efficacy studies to assess the contribution of communication and behaviour change to improving infant and young child nutrition.

Citation
The study

The “INULA – Improving Nutrition through Local Agrobiodiversity” project was a 2.5-year collaborative research programme funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and the CGIAR Research Program on Agriculture for Nutrition and Health. It focused on improving dietary quality through agricultural biodiversity, in collaboration with the University of Giessen (Germany), Kenyatta University (Kenya), district community health workers and target community members in Western Kenya.

The study examined the quality and accessibility of complementary foods suitable for infants and young children aged 6 months to 2 years in Western Kenya to see if the use of diverse locally available foods could improve the dietary quality and in turn the nutrition and health of the target groups. Agricultural biodiversity comprises a vast array of plant and animal, cultivated and wild species. Many of the species and their varieties or breeds have high nutritional significance. If made available and used effectively, they could contribute considerably to the dietary diversity and quality during all seasons of the year.

To understand the use of local agricultural biodiversity in diets, nutrition surveys were carried out at the household level to understand the current composition of the diet and its nutritional value. Nutrition education was targeted to mothers and caregivers in half of the 40 villages that participated in the project by working closely with local community health workers. The remaining 20 villages were used as controls and were similar in characteristics, but did not receive any additional support to change child feeding behaviours.

“We reach only mothers who come to the health facilities. We could reach out more but we need nutrition training ourselves and training aids.”

Community Health Worker

The nutrition education sessions

A total of four nutrition education sessions were carried out with up to 15 caregivers in 20 intervention villages. Prior to the commencement of the nutrition education sessions, community health workers’ nutrition knowledge was assessed. They also received some participatory training on how to train mothers on different nutrition topics. The nutrition education was then conducted in cooperation with the respective community health worker in each village.

Session 1 was based on available teaching material on Infant and Young Child Feeding from UNICEF/USAID that emphasized the importance of breastfeeding, complementary feeding and typical complementary foods for different age groups.

Session 2 was designed using training material from the Food and Agriculture Organization of the UN (FAO), focusing on addressing challenges in the feeding practices identified in the nutrition and agriculture baseline surveys. In this session, the importance of a diverse and balanced diet was highlighted. This session also introduced the concept of the food circle (FAO) and a seasonal food availability calendar for each district. It promoted the integration of locally available agricultural biodiversity into diets, and included a cooking demonstration.

Session 3 reviewed the first and second sessions followed by practically preparing nutritious and diverse meals for children aged 6-23 months and included another cooking demonstration on how to prepare nutritious complementary meals using a variety of locally available foods. For this, the only foods used were those brought by and available to caregivers in the village.

Session 4 addressed how to obtain and prepare safe, adequate (quantity and texture) and nutritious (quality) meals for infants and children aged 6-23 months. Foods that mothers may use to enrich the diet were discussed. Different ways to improve budgeting for food to get the best value for money and still prepare nutritious complementary foods were shared with caregivers as well as how families can increase the type and amount of locally available and nutritious foods for use in complementary feeding.

Major findings

1) The nutrition education intervention motivated the caregivers to improve the diversity and quality of complementary diets by using local food resources. As shown in Figure 1, at the end of the project (after the nutrition education was finished), more infants and children in the intervention group were consuming foods from the food groups fruits and vegetables, dairy products, legumes and nuts. However, low consumption of animal source foods, especially flesh meats (beef, poultry, fish etc.) and eggs, still persisted despite the additional training.

2) Infants and children aged 6-23 months received a more diverse diet after their mothers had been informed about better food choices. This was reflected in the dietary diversity scores whereby infants and children in the intervention group increased their score over the study from 3.5 to 4.2 food groups per day, and the controls dropped from 3.5 to 3.3. The change in the intervention group was statistically significant (P=0.001) (See Figure 2).

3) The nutrition knowledge of caregivers also improved as shown by a knowledge score reflecting the knowledge about three key nutrients. While the mean score (range 0-21) increased in the control group from 2.7 to 3.7, it increased in the intervention group from 3.1 to 8.2. Yet, it did not have a direct and significant effect on the dietary diversity score of children. While increased nutrition knowledge is an important factor, on its own it cannot lead to changes in behaviours but motivation or incentives to change behaviours seem to be similarly significant.

4) Community health workers were highly motivated to pass on nutrition knowledge, yet, they received little or no training so far on human nutrition and had no reference or training material.

Grains, roots and tubers
Other fruits and vegetables
Diary products
Vit A-rich fruits and vegetables
Legumes and nuts
Eggs
Meat and fish

Figure 1
Percentage of infants and children aged 6-23 months who consumed foods from different food groups during the previous 24 hours at baseline (July/August 2012; n=400) and endline (July/August 2013; n=407) in the intervention villages (received nutrition education) and control villages in Western Kenya.

Child Dietary Diversity Score (range 0-7 food groups) of infants and children aged 6 to 23 months showing the number of different food groups from which foods were consumed during the previous 24 hours; data shown for baseline (n=403) and endline (n=407) in the intervention villages (received nutrition education) and control villages in Western Kenya.