Reinventing Complementary Foods in the African Great Lakes

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Abstract

Undernourishment in Uganda is estimated to affect 25% of the population. Stunting and underweight incidence rapidly increase among infants starting at four months of age. Prevalence of stunting usually peaks at 50% around 26 months. This period coincides with cessation of breast feeding and introduction of low nutrient-density complementary foods, which are often introduced earlier than recommended by the World Health Organization (WHO). As a result, too many Ugandan children are missing out on critical nutrition during their first 1000 days of life. Complementary foods used in Uganda are typically starch based and have little protein or fat. Frequently they are given in dilute watery preparations. The frequency of feeding with complementary foods is typically 2-3 times per day—usually when the family takes meals. Infants are not always fed on a more frequent schedule as recommended by WHO. Often specialized complementary foods are not prepared separately from the family's normal food due to time and fuel availability. Mothers generally feed infants with mashed food from their own plates. Additionally, the notion of separating food out for consumption only by some of the children in a family is incongruent with the household's food distribution dynamics, making specialized complementary food preparations inappropriate and rejected. Fruits and vegetables produced in the household are more often sold than consumed at homes. Consequently Ugandan fruit and vegetable consumption remains low. Based on this information we contend that ideal Ugandan complementary foods should: use familiar ingredients; be easily prepared; and be good sources of protein, fats, and micronutrients. Additionally, the complementary food should be acceptable to all family members. Mix-and-match recipe cards have long been a staple of U. S. family and health magazines for making pureed foods (e.g., smoothies, sauces) from a wide variety of fruits and vegetables. Therefore, we propose the creation of the *Complementary Food Recipe Card* as a simple visual guideline for families to use to prepare tasty, nutrient-dense, and wholesome complementary foods. These cards can be easily disseminated to extension officers in the field, representing a clear linkage between agriculture, food preparation, gender, nutrition and health.

Introduction

The FAO estimates that 25% of the population of Uganda is undernourished (5). The World Food Programme estimated that Uganda lost 5.6% of its 2013 GDP to malnutrition related productivity losses. Unfortunately, malnutrition starts early in Uganda, and 1 in 3 children are stunted (16). Typically stunting increases rapidly after the cessation of breast feeding because common complementary foods inadequately meet the nutritional needs of infants (4, 11). Prevalence of stunting peaks at 50% when children reach the age of 25 months (4). Many times, infants are fed complementary foods before the WHO-recommended age of 6 months (4,10,11,8). Even when these foods are given at the right time, they have very low nutrient density, and they may frequently be prepared under poor sanitation (10). Therefore, improvements in the nutrient quality and feeding practices of complementary foods in Uganda have the potential to significantly improve child nutrition.

In Uganda, infants are often fed a sugar-sweetened water porridge of maize, cassava, matooke (cooked plantain), or some other starch. As a result, these foods rarely meet infant needs for fat, protein, and micronutrients. Feedings are also less frequent than recommended by WHO because of time and fuel constraints that make it difficult to prepare food outside of family meal times (6, 9-12). In general, fruit and vegetable consumptions remains low in Uganda. The 2008 Uganda Food Consumption Survey reported that child-bearing women consumed around 1% of their calories from vegetables and 4-6% from fruits (8). Because we know that infants are frequently fed with food from their mother's plates, there is a reasonable indication that fruit and vegetable consumption among infants is also quite low and is corroborated by other studies' findings (3, 8). Poor sanitation practices appear to have a significant impact on childhood undernutrition in Uganda, and, along with use of low-quality complementary foods, seem to account for the persistence in stunting and micronutrient deficiency in food secure parts of the country (10). Cultural acceptability is another barrier to the adoption of specialized complementary foods. While there are purpose-made complementary foods on the market in Uganda, they are not universally accepted for a variety of reasons including cost and time to prepare extra food (9-12). During meal times, it is not culturally appropriate for one child to consume food that is not available to the other children so complementary foods should ideally be accessible and acceptable to all family members (9).

Figure 1. A child consuming complementary food (20).

Hypothesis

By implementing a mix and match recipe card that helps mothers to select ingredients of diverse nutrient density and simplify preparation of complementary foods, we can enhance their nutritional quality and acceptance in Uganda.

Materials and Methods

Ideal Complementary Food Characteristics:

1. Easy to prepare
2. Good source of fat, protein, and micronutrients
3. Acceptable for consumption by all family members
4. Prepared from commonly available ingredients
5. Contain 300 kcal, 4g protein, and 10-15g fat per 100g (13, 17-18)

Types of foods first fed to children aged 6-23 months in three Uganda regions, 2008

	Kampala n= 160		South-West n= 161		Northern n=148	
Food	n	%	n	%	n	%
Potato (Irish)	82	55%	38	24%	0	0%
Milk (goat or cow)	76	51%	76	47%	37	25%
Matooke (banana)	33	22%	114	71%	13	9%
Porridge (sorghum flour)	13	9%	21	13%	19	13%
Commercial baby formula	12	8%	0	0%	1	1%
Porridge (millet flour)	9	6%	16	10%	1	1%
Sweet potato	8	5%	67	42%	17	12%
Porridge (maize flour homegrown)	6	4%	20	12%	15	10%
Commercial rice cereal	5	3%	20	12%	47	32%
Biscuits/cookies	5	3%	14	9%	14	10%
Porridge (maize flour purchased)	2	1%	0	0%	0	0%

Source: Harvey, Phil, Zo Rambeloson and Omar Dary. The 2008 Uganda Food Consumption Survey: Determining the Dietary Patterns of Ugandan Women and Children. A2Z: The USAID Micronutrient and Child Blindness Project, AED, Washington D.C., 2010.

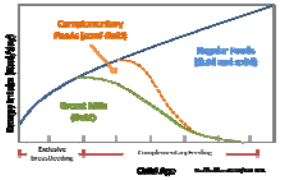

Figure 2. Schematic representing introduction of complementary foods during growth and energy intake (18).

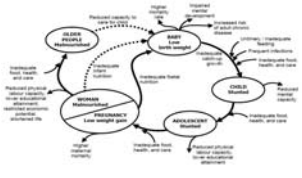

Figure 3. Malnutrition in the life cycle (7).

Figure 4. Outdoor produce market in Northern Uganda (21).

Figure 5. Complementary foods available at a grocery store in Kampala (19).

The Complementary Food Recipe Card

Use this much:	Starch 2 parts	Protein 1 part	Fat 1 part	Fruit 2 parts
Choose 1 food from each column to blend together	Sorghum/maize/millet	Milk	Cooking Oil	Passion Fruit
	Matoke (plantain)	Beans	Butter	Jack Fruit
	Sweet Potato	Poultry/Meat/Fish	Palm Oil	Tamarind
	Cassava	Eggs	Groundnuts	Papaya

- Cooked ingredients should be mixed together into a paste.
- They may be seasoned with a small amount of iodized salt and table sugar to improve flavor.

Figure 6. Example of complementary food using sweet potatoes, powder milk, palm oil, and apple puree.

Photos are representative of the types of foods available in Uganda

Materials and Methods

- A literature review and nutrient composition data were used to develop a recipe card for a mix-and-match complementary food.
- Food matrices were chosen based on food group, familiarity, and availability (3,8,14-15,17,19).
- Estimated nutritional calculations were completed using Food Processor Software with information from the USDA nutrient database (13).

Potential Limitations and Next Steps

- It is highly likely that Recipe Cards tailored to each region will be more successful.
- Prized staple foods in some regions of Uganda are poorly regarded in others due to the traditional food values of different ethnic groups (2).
- There could be resistance to use this Card as cultural views are very strong among women preparing complementary foods.
- Promotion of exclusive breast feeding until six months of age should be emphasized in Cards as well. Use of breast milk as much as possible mixed with ingredients is recommended.
- Finalize the appearance of the Recipe Card in order to remove text so that it is suitable for piloting in Uganda.

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Acknowledgements

We appreciate the financial support provided by USAID's Purdue University Borlaug Fellows in Global Food Security Program (EMS), and Borlaug Higher Education for Agricultural Research and Development (BHEARD) Program fellowship (RB) for funding doctoral studies. Special thanks to Graduate College Focal Point.

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