

COMMENTARY

Nutrition education centers: A community-based approach to management of malnutrition

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Introduction

Nutritional health is a core aspect of sustainable development. Globally, progress has been made in reducing child stunting and promoting exclusive breastfeeding; nevertheless, anemia, malnourishment of mothers and children, and general food insecurity are still persistent, requiring multi-

faceted approaches to address those challenges (Food and Agriculture Organization of the United Nations [FAO] et al., 2022). Uganda, the location of this case study, adopted both global and regional strategies. For example, Uganda is a signatory to the United Nations Sustainable Development Goals (SDGs) targeting an end to all forms of malnutrition by 2030 (United Nations, 2015). Regionally, Uganda is also a signatory to the 2014 Malabo Declaration, which aimed at enhancing

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Author Note

The first author's masters' thesis formed the basis of this article (Ikendi, 2019).

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food production and reducing malnutrition by 2025 (African Union, 2014). The Uganda Nutrition Action Plan I (UNAP) of 2011–2016 made gains in reducing child stunting from 33% to 29% and wasting from 5% to 4%. However, mothers and children's malnourishment persists (Office of the Prime Minister [OPM], 2020). The UNAP II 2020–2025 targets reducing malnutrition by leveraging collaborations to improve the functionality of nutrition intervention programs (OPM, 2020).

UNAP II aligns with our study of the Center for Sustainable Rural Livelihoods (CSRL) nutrition education centers in Uganda. The CSRL is an initiative of Iowa State University (ISU) established in 2003, based on a theory of change that involves identifying and building community capital toward food and nutrition security, improving household income, and accumulating assets (Ikendi & Retallick, 2023a; Masinde, Butler et al., 2015; Sseguya et al., 2009; 2015). The CSRL works with Makerere University (MAK) and several NGOs, including Volunteer Efforts for Development Concerns (2004–2014) and ISU Uganda Program (ISU-UP, 2014–present) (Butler & Acker, 2015; Ikendi & Retallick, 2023b). During 2004–2014, CSRL adopted a farmer-to-farmer extension approach, forming community food security groups to support farmer livelihoods (Butler & Mazur, 2015; Masinde, Butler et al., 2015; Sseguya et al., 2015). In 2014 the CSRL/ISU-UP adopted a “comprehensive capacity development” model (Ikendi, 2019, p. 50; see also CSRL, 2017). The model involves the lives of all people, from pregnancy to seniors, through interrelated livelihood programs. These programs include agronomy and postharvest management (Ikendi, Owusu, Masinde, Bain, & Oberhauser, 2023), livestock integration (Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023a; Masinde, McMillan et al., 2015), nutrition and infant feeding, and water supply hygiene and public health education (Ikendi, Owusu, & Masinde, 2023; Ikendi, Owusu, Masinde, Oberhauser, & Bain 2023b; Masinde, McMillan et al., 2015; Winham et al., 2016), school gardens and global service-learning (Ikendi, Retallick et al., 2023a; Nonnecke et al., 2015; 2016), and community income-generating innovations (Ikendi, 2019; Martin, 2018).

Abbreviations

Center for Sustainable Rural Livelihoods: CSRL
Food and Agriculture Organization of the United Nations (UN): FAO
Iowa State University: ISU
Iowa State University Uganda Program: ISU-UP
Makerere University Kampala Uganda: MAK
Mpirigiti Rural Training Center: MRTC
Nutrition education centers: NECs
Nongovernmental organizations: NGOs
Office of the Prime Minister: OPM
Uganda Nutrition Action Plan: UNAP
UN Sustainable Development Goals: SDGs

The CSRL Nutrition Education Programs

The CSRL nutrition programs have two components: school feeding and nutrition education centers (NECs). The school feeding initiative aims to improve nutrition among pupils by providing meals using contributions of maize and beans from parents and programs, and products from school gardens (Byaruhanga, 2016; Ikendi, Retallick et al., 2023a; Nonnecke et al., 2015; 2016). This commentary discusses the NECs, community-based rehabilitation homes that aim to help end hunger and malnutrition in Kamuli district, Uganda (Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023b, 2023c; Masinde, McMillan et al., 2015). Community members volunteer their homes for the CSRL/ISU-UP to set up the NECs based on demand and the availability of funds. Demand is assessed through rapid appraisals by program nutrition coordinators based on estimates of malnourished children, willingness of members to offer their homes as temporary operational sites, and the availability of hygiene facilities, including pit latrines, kitchens, and water sources (boreholes). Daily operations of the NECs are managed by community-based NEC trainers, mostly former enrollees who went through malnutrition rehabilitation. Trainers are mentored and monitored by ISU-UP nutritionists, and the nutrition associate directors of CSRL supervise all nutrition programs launched by ISU in Uganda. NECs have a sequential order of operation, from enrollment to graduation (discharge) and continued monitoring and evaluation of graduates to minimize relapses.

Enrollment

Three categories of at-risk-for-malnutrition clients are enrolled: mothers, infants, and children, who may come with guardians. Guardians are primary caretakers of at-risk-for-malnutrition infants, children, and/or mothers who are young or have disabilities. Mothers are either pregnant or breastfeeding. Infants (0–24 months) and children (24–59 months) of age are (a) breastfeeding and on therapeutic porridge (details below), (b) infants less than six months old on exclusive breastfeeding who enrolled with their mothers, (c) babies born at the NECs to at-risk-for-malnutrition pregnant mothers during their rehabilitation, and/or (d) malnourished children—the NEC only enroll children suffering from moderate acute malnutrition (Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023b) and the rest of the children come along with their mothers. Both mothers, infants, and children are referred to the NECs by either community leaders, healthcare nurses when mothers go for routine care and treatments, NEC trainers during community monitoring work, ISU-UP staff during fieldwork, NEC hosts, and/or fellow mothers. When mothers and/or their children come to the NECs, trainers record their biodata and anthropometric data, which is used as the baseline for monitoring improvements during rehabilitation. Data include age, sex, mid-upper arm circumference (MUAC), height or recumbent length (for infants), weight, vaccination, and mother's prenatal care.

Complementary Services

NEC services are available Monday through Friday. Most of the services are accessed by community members irrespective of their affiliation with the NECs. Among the services, therapeutic porridge (cooked) and/or flour is served only to enrolled clients. Mothers who live far away, are given packed flour to cook at home (details below). Up to 89.6% ($n=283$) of 316 CSRL/ISU-UP households in this study received some services, including therapeutic porridge, nutrition and health information, immunization during community outreach on clinic days or at the NECs, HIV/AIDS testing, and counseling and/or family planning conducted with assistance from government

healthcare nurses (Ikendi, Owusu, & Masinde, 2023; Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023b).

Therapeutic Porridge Flour Production, Cooking, and Eating

The flour used for the therapeutic porridge is made from crops grown by farmers and from local fish (silver fish), which are purchased by CSRL/ISU-UP. The flour ingredients include millet, amaranth grain, soybean, maize, and dried silver fish, which are ground together at a mill. Ground flour is kept in CSRL/ISU-UP storage and provided to NECs based on the number of clients they have enrolled. Cooking rotations are organized by NEC trainers; mothers help in cooking and serving the porridge. Sugar and milk are also added to the porridge. CSRL/ISU-UP nutritionists conduct training and demonstrations on cooking the porridge. After cooking, each mother and/or child is given three cups: one is eaten at the NEC, and two are packed for eating at home. A cup equals 350 ml (11.8 oz.) and yields 457 kilocalories (457 U.S. calories), and 17g of protein for every 100g of porridge.

Community Education

NEC clients and interested community members are routinely trained to build their capacity toward food and nutrition security. Education programs include agronomy and postharvest management training to equip households with agronomic practices that increase food production and income (Ikendi, Owusu, Masinde, Bain, & Oberhauser, 2023). Nutrition, infant feeding, and health training aim at behavioral change in feeding, maternal, and reproductive practices, including prenatal care, childbirth, breastfeeding, and sanitation, such as construction of sanitation facilities (Ikendi, Owusu, & Masinde, 2023; Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023b; Masinde, McMillan et al., 2015; Winham et al., 2016). Livestock integration programs improve the production and consumption of animal-source proteins (Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023a; Masinde, McMillan et al., 2015). Community income-generating innovation strategies are provided to harness clients' handicraft skills and expand their income sources (Ikendi, 2019; Martin, 2018),

increasing their food purchasing power in current trend of soaring food prices (Headey & Ruel, 2023).

Training programs are planned by CSRL/ISU-UP extension personnel and community stakeholders doing related work, like the government departments of water, agriculture, health, and community development, and various nongovernmental organizations (NGOs) involved in related work, such as gender issues. Schedules are synchronized (Figure 1); for instance, during planting, training in land preparation and sowing practices are provided, and during harvesting periods, post-harvest technologies are emphasized. Program nutritionists, NEC trainers, and nurses continuously conduct nutrition, water, and health training. Global service-learners from ISU and MAK participate in reciprocal learning while working with the communities (Ikendi, Retallick et al., 2023b).

Monitoring of Clients

Monitoring keeps track of clients' nutritional health changes during rehabilitation. NEC trainers monitor participants at their NECs by taking anthropo-

metric measurements and comparing them with the initial and continuous data collected by CSRL/ISU-UP nutritionists over time. These records are used in deciding when to graduate (discharge) clients. Trainers also do home visits once a month to check the state of clients' sanitation facilities, like latrines, bathrooms, plate stands, rubbish pits, tippy-taps (simple and easily made handwashing stations that do not require piped water), and kitchens. Program agronomists keep track of mothers' records of field gardens, keyholes, sacks, and kitchen gardens and check the seeds and seedlings they were given to ensure they were planted properly. In addition to millet, soybean, and amaranths, common vegetables and greens, like spring onions, spinach, collards, eggplants, and garden eggs, are also given to NEC clients (Ikendi, Owusu, Masinde, Bain, & Oberhauser, 2023). NECs also have demonstration and learning gardens for most crops and vegetables, and the program has a livestock demonstration at the Mpirigiti Rural Training Center for training clients on livestock management (Ikendi, Owusu, Masinde, Oberhauser, & Bain, 2023a; Ikendi & Retallick, 2023b, p. 645).

Figure 1. Training Schedule for February 2019 by Nutrition Education Centers and Affiliated Health Centers

Days	Mondays		Tuesdays		Wednesdays		Thursdays		Fridays
Health Centers	Bugeywa	Nabirama	Bugeywa	Namasagali	Butansi	Namasagali	Butansi	Namasagali	Namasagali
NECs	Nakyaka	Kasozi-Nakanyonyi	Kabalira-Bugeywa	Bususwa	Bubogo-Kiwungu	Kisaikeye	Naluwoli	Kiconco	Kakindu
Dates of Training in February 2019 and Training Themes on Food and Nutrition Strategies	4th Balanced Diet (Food Groups and their Uses)	4th Immunization and Family Planning	5th HIV Testing and Counseling	5th Personal Hygiene: Nails, Hairs, Bathing	5th Immunization and Family Planning	6th Immunization and Family Planning	7th Indigenous Chicken Management	7th Personal Hygiene: Nails, Hair, Bathing	8th Immunization and Family Planning
	11th Agronomic Practices of NEC Produce	11th Effects of Gender-based Violence on Children	12th Agronomic Practices of NEC Produce	12th Immunization and Family Planning	13th Balanced Diet (Food Groups and their Uses)	13th Agronomic Practices of NEC Produce	14th Immunization and Family Planning	14th Immunization and Family Planning	15th Indigenous Chicken Management
	18th Immunization and Family Planning	18th Agronomic Practices of NEC Produce	19th Immunization and Family Planning	19th Agronomic Practices of NEC Produce	20th Agronomic Practices of NEC Produce	20th HIV Testing and Counseling	21st Agronomic Practices of NEC Produce	21st Balanced Diet (Food Groups and their Uses)	22nd Agronomic Practices of NEC Produce
	25th HIV Testing and Counseling	25th Indigenous Chicken Management	26th Balanced Diet (Food Groups and their Uses)	26th HIV Testing and Counseling	27th HIV Testing and Counseling	27th Balanced Diet (Food Groups and their Uses)	28th HIV Testing and Counseling	28th Agronomic Practices of NEC Produce	1st March End of Month Meeting

Source: Ikendi (2019, p. 56).

Graduation after Rehabilitation

Based on biometrics records, an assessment is done for rehabilitated clients to qualify for graduation or discharge. For children, the criteria is based on having an MUAC of at least 13.7cm (5.4 inches), along with the health and nutrition outlook of the child. Overstaying at the NECs is not recommended because it can result in becoming overweight from feeding on therapeutic porridge and also increases program expenses. Mothers are prepared to graduate by receiving a package of planting seeds, such as soybean, grain amaranths, and millet, a season before their planned graduation

so that they can continue making porridge (Ikendi, Owusu, Masinde, Bain, & Oberhauser, 2023). Mothers undergo a discharge training process, and then graduation is conducted. Graduates are issued recovery certificates to be eligible to enroll in other programs, including Food and Nutrition Security Support Groups, to ensure their sustainability and increase livelihood strategies. Rehabilitation and empowerment of women through the NECs is one way of influencing future food production, reducing the burden of food and nutrition insecurity in Uganda (Barak et al., 2023).



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