

Towards Nutrition Security Among Mothers and Children Through Livelihood Programs

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Introduction

Promoting nutrition health is a noble cause among institutions and individuals. Uganda, our case study has had a historical track of strategies for food and nutrition security. The 2020-2025 nutrition action plan, for example, seeks to address nutritional issues by leveraging public-private partnerships to improve the functionality of nutrition interventions (OPM, 2020). Part of the partnership includes the Iowa State University's Center for Sustainable Rural Livelihoods (CSRL) in Kamuli (Butler & McMillan, 2015). The CSRL adopted a "comprehensive lifespan approach to capacity development", a model that touches the lives of all people from pregnancy to seniors through interrelated livelihood education programs (LEPs) to build their capacities in food and nutrition strategies (Ikendi et al., 2023a). This study sought to determine whether participation in the LEPs impacts the nutritional health status of mothers and children. We also determined the demographic, maternal, and reproductive factors that impacted nutritional health. This study aligns with the seventh goal of the U.S. agriculture education research agenda which includes designing programs to address complex issues (Andenoro et al., 2016).

Conceptual Framework

Food-secure households are those who have consistent access to foods to meet their nutritional demands for a physically, economically, and socially healthy life (FAO et al., 2013). Households also require to be nutritionally secured – hence the term food and nutrition security (FNS) which includes all elements of food security coupled with conducive clean environments, reducing household disposition to diseases. The FNS concept is comprised of four core pillars, including availability, access, utilization, and stability which work in synergy for a stable FNS state in its entirety (FAO et al., 2013). Food security focuses on availability and access, while nutrition focuses on food utilization within our bodies. Food stability relates to future assurances of food. The CSRL uses a capacity-building model that looks at the community assets and starts from where people are in building their livelihood strategies through participation in LEPs (Masinde & McMillan, 2015; Ikendi & Retallick, 2023). Interventions need to understand the nature of the community where they operate; Lanou et al. (2021) also echoed the vital role of meeting and starting from where people are in promoting a behavioral change in food-eating patterns.

Methodology

This comparative study was part of a larger survey that assessed the state of food and nutrition security in Kamuli where CSRL implements LEPs to end hunger. A sample size of 306 was established from 1,503 clients served by the Nutrition Education Centers (NECs) from 2014-2018 (Ikendi et al., 2023b). The community-based NEC trainers led the research team to the target households. We accessed 316 households of LEP participants that had 292 mothers and 394 children (0-59 months). We also interviewed an additional 138 non-LEP participants for comparison that had 121 mothers and 121 children. During data collection, participation in LEPs was determined as a "yes" or "no". Biodata on age at first pregnancy of mothers; sex and age of children were collected. We collected the number of antenatal clinic visits, health facilities where mothers gave birth, and any child mortality. The NEC trainers collected anthropometric indices from mothers and children. Indices were weight in kilograms as prescribed by Lee and Nieman (1996) and height in centimeters, and these were recorded to the nearest 0.1. To determine the nutrition health status of mothers, we used the Body Mass Index ($BMI=Kg/M^2$) classified as $<18.5Kg/M^2$ (underweight), $18.5-24.9Kg/M^2$ (healthy), and $\geq 25Kg/M^2$ (overweight) mothers (WHO, 2003). For children, data were converted from XL to DBF format and exported to WHO Anthro (Version 3.2.2, January 2011) to convert indices into Z-scores for age. Data were

imported from WHO Anthro to XL for grouping and analysis using SPSS. To determine the presence of malnutrition forms including stunting, underweight, and wasting, the height-for-age (HAZ), weight-for-age (WAZ), and weight-for-height (WHZ) were generated respectively. Children whose HAZ, WAZ, and WHZ were below minus two standard deviations from the median of the reference population were stunted, underweight, and/or wasted respectively on a global standard scale (WHO, 1995). We then determined associations in nutritional health status.

Results and Discussions

Nutritional health varied between households and participation in the LEPs. Most mothers were healthy (70.7%), overweight (16.7%), and underweight (12.6%). Child stunting rates were higher (37.1%) compared to wasting (16.7%) and underweight (22.7%). The health status of mothers had no significant relationship with participation in LEPs although participants were consistently healthier. In children, participants in the agronomy and postharvest programs were associated with healthy children (55.1%) than healthy non-participants (46.1%). The study found that the high incidence of being underweight among mothers can be attributed to early pregnancy at 12 years and up to 69.3% had given birth at 19 years. Early birth among teenage girls correlated with stunting (Fink et al., 2014). Also, most stunted children (44.6%) were associated with underweight mothers and 25.8% with overweight mothers. Underweight mothers were associated with underweight children (27.7%). By gender, stunting affected more boys than girls. Stunting affected children of 24-35 months of age, a weaning period from breastfeeding, where children begin to scavenge food around the home exposing them to contamination (Leroy et al., 2014).

Related to maternal practices, at least four antenatal clinic visits (ANCs) are recommended before giving birth (Lincetto et al., 2006). However, found low ANC practices of mothers where only 66.9% of the fourth youngest child had at least four ANCs. Besides, there were negative trends where ANCs were reducing as the number of births increased. Our study found that 2.5% had lost their babies at birth. Good health care during the antenatal period increases the maternal health of mothers and children's survival rate at birth (Tekelab et al., 2019). Also, the practices of mothers giving birth with traditional attendants, at home with nurses, relatives, or self-support were increasing with an increase in children born. It was estimated at 14.3% for the youngest child relative to 11.7% for the fourth youngest child. Nevertheless, at the national level, 74% of mothers gave birth with the help of skilled nurses from health facilities (UBOS & ICF, 2018). This proportion is lower than what we found in our study at 87.6% for the youngest child, a finding that could be related to the knowledge gain and implementation of practices of nutrition, infant feeding, and health education of mothers within this population (Ikendi et al., 2023b).

Conclusions, Implications, and Recommendations

Achieving nutritional health security is possible with behavioral changes in maternal and reproductive health; and infant and child feeding practices (Ikendi et al., 2023c; Masinde et al., 2015). Proper community nutrition education is vital to improve the welfare of the household. Antenatal care, childbirth place, and their associated assistance from professional Nurses are indicators of good maternity practices. Based on our findings, we recommend more collaboration with health workers to continue educating and encouraging households to follow good maternity practices and monitoring children to reduce relapses after rehabilitation, especially for the NEC clients. Adopt the production of vegetables using micronutrient gardens like keyholes, kitchens, and sacks, an idea emphasized in agronomy and postharvest programs (Ikendi et al., 2023d), and engage in livestock programs where they learn about different aspects of sustainable livestock production and obtain animal-source proteins and income from sales (Ikendi et al., 2023e).

References

- Andenoro, C. A., Baker, M., Nicole L. P., Stedman, L. P. N., & Weeks, P. P. (2016). Research priority 7: Addressing complex problems (pp. 57-66). Gainesville: FL.
- Butler, L. M., & McMillan, D. E. (2015). *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda*. Kumarian.
- FAO., IFAD., & WFP. (2013). *The state of food insecurity in the world 2013*. Rome: Italy.
- Fink, G., Sudfeld, C. R., Danaei, G., Ezzati, M., & Fawzi, W. W. (2014). Scaling up access to family planning may improve linear growth and child development in low and middle-income countries. *PloS One*, 9(7), e102391. <https://doi.org/10.1371/journal.pone.0102391>
- Ikendi, S., & Retallick, M. (2023, April 26-29). *Exported through the theory of change: An inquiry into the compatibility of the U.S. land grant philosophy in Uganda* (Proceedings, pp. 358-361). International Agricultural and Extension Conference. Guelph: Canada.
- Ikendi, S., Owusu, F., Masinde, D., Oberhauser, A., & Bain, C. (2023a). Does participation in livelihood education programs impact household food security? A comparative study in rural Uganda. *Journal of Agriculture, Food Systems, and Community Development*.
- Ikendi, S., Owusu, F., Masinde, D., Oberhauser, A., & Bain, C. (2023b). Nutrition education centers: A community-based approach to management of malnutrition. *Journal of Agriculture, Food Systems, and Community Development*.
- Ikendi, S., Owusu, F., & Masinde, D. (2023c, May 15-18). *Community education for behavioral change towards food and nutrition security* (Proceedings, pp. 395-398). National American Association for Agricultural Education (AAAE) Conference. Raleigh: NC.
- Ikendi, S., Owusu, F., Masinde, D., Bain, C., & Oberhauser, A. (2023d, May 15-18). *Assessment of agronomy extension education on farmers' empowerment towards food production in rural Uganda* (Proceedings, pp. 1016-1036). National AAAE Conference. Raleigh: NC.
- Ikendi, S., Owusu, F., Masinde, D., Oberhauser, A., & Bain, C. (2023e, September 18-20). *The renaissance of African livelihoods through livestock extension education programs*. Western Region of the AAAE Conference. Logan: UT.
- Lanou, A. J., Mathews, L. G., Speer, J., Mills, L., & Gold-Leighton, N. (2021). Effects of experiential food education on local food purchasing and eating behavior. *Journal of Agriculture, Food Systems* 10(4), 211–224. <https://doi.org/10.5304/jafscd.2021.104.006>
- Leroy, J. L., Ruel, M., Habicht, J. P., & Frongillo, E. A. (2014). Linear growth deficit continues to accumulate beyond the first 1000 days in low-and middle-income countries. *The Journal of Nutrition*, 144(9), 1460-1466. <https://doi.org/10.3945/jn.114.191981>
- Lincetto, O., Mothebesoane-Anoh, S., Gomez, P., & Munjanja, S. (2006). Antenatal care. In J. Lawn & K. Kerber. (Eds.), *Opportunities for Africa's newborns* (pp. 51-62). WHO.
- Masinde, D., & McMillan, D. E. (2015). Starting where the people are (pp. 111-144). Kumarian.
- Masinde, D., McMillan, E. D., Rothschild, M., & Nonnecke, G. (2015). Leaving door open to emerging needs and opportunities (pp. 145-164). Kumarian.
- Office of the Prime Minister (OPM). (2020). *Uganda nutrition action plan II (2020-2025): Leaving no one behind in scaling up nutrition actions*. Kampala: Uganda.
- Tekelab, T., Chojenta, C., Smith, R., & Loxton, D. (2019). The impact of antenatal care on neonatal mortality in sub-Saharan Africa. <https://doi.org/10.1371/journal.pone.0222566>
- Uganda Bureau of Statistics (UBOS) and ICF. (2018). *Uganda demographic and health survey 2016: Key indicators report*. Kampala: Uganda, and Rockville: Maryland, USA.
- World Health Organization (WHO). (1995). *Physical status: The use of and interpretation of anthropometry, report of a WHO expert committee*. Geneva: Switzerland.