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Enablers, difficulties and hindrances of nutrition recommendations application in Nadunget sub-county - An analysis of women's perceptions

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Abstract

Introduction: In developing countries, nutrition education is often implemented as part of larger programs to address underlying causes of malnutrition. Putting gained knowledge into practice often remains a challenge.

Objective: Aim of this study was to identify enablers, difficulties and hindrances of nutrition recommendations application, given during nutrition education within a Welthungerhilfe (WHH) project.

Research Design: A quantitative study was carried out with women in two WHH project villages of Nadunget sub-county. Five nutrition sessions were offered to participants between February and March 2018. Shortly after the intervention (three weeks), women were interviewed (April 2018), using standardized and open questions. Indicators, influencing each nutrition recommendations application were identified and quantified.

Results: Main enablers for changes in dietary behaviour were affordability of food (financial means generally given), food availability, knowledge gain from nutrition education and temporary financial means. At the same time, affordability of edibles (financial means generally not given) was identified being a common difficulty and hindrance alike. Special enablers were taste and food preparation. Another hindrance identified was a positive attitude towards alcohol.

Discussion: Women's perceptions were investigated in after finalization of nutrition education. However, the identified factors should be considered as immediate or short term factors. Nevertheless, understanding women's perceptions can shed light on why gained knowledge can possibly not be put into practice and to adapt future nutrition education's success within the project's framework.

Introduction

Malnutrition is still a widespread problem in developing countries. Today 821 million, or one in every nine people suffer from hunger globally. More than 150 million children under five are affected by stunting and 50.5 million by wasting (FAO, 2018a). Data from the Ugandan Demographic and Health

Survey (UDHS) 2016 showed that at national level 29% of children below five years of age were stunted and 4% wasted. Underweight in female adults (BMI \leq 18.5 kg/m²) accounted for 8.7% (UBOS & ICF, 2018). The national indicators do not reflect the situation in Karamoja, the North-East of Uganda. There, malnutrition levels are more alarming compared to national level. In Karamoja, more than 30% of the children below 5 years of age are stunted and compared to national level more than twice as many children below 5 years of age are wasted (table 1).

Table 1: Nutritional situation at national level and in Karamoja region of Uganda in 2016 (UBOS & ICF, 2018).

| Indicator | National | Karamoja |
|--|---------------------------|----------------------------|
| Stunted children below 5 years of age (-2SD) | 29% | 35.2% |
| Wasted children below 5 years of age (-2SD) | 4% | 10% |
| Under-5-mortality rate per 1000 live births | 64 | 102 |
| Overweight and obesity in adult's (BMI \geq 25 kg/m²) | Women: 23.8% Men: 8.9% | Women: 5.7% Men: 2.0% |
| Underweight in adult's (BMI \leq 18.5 kg/m²) | Women: 8.7% Men: 14.1% | Women: 36.1% Men: 33.7% |

Causes of malnutrition are multifaceted and so are interventions towards addressing them. Improved access to adequate and safe foods may be addressed by agricultural interventions, such as improved production through home gardens. Nutrition education including behaviour change communication may be another useful intervention to address the causes of malnutrition (World Bank, 2013). Studies from India, Kenya and Uganda, focusing on enhancement of women's and children's dietary diversity through nutrition education showed an increase in dietary diversity among women after they participated in the intervention (Garg & Kashyap, 2006; Waswa et al., 2015; Ickes et al., 2017). Research on the effect of nutrition education among Karamojong women and children is largely missing. Furthermore, there is poor knowledge concerning enabling and hindering factors to put nutrition education messages at household level into practice. Therefore, the objectives of this study were:

- To investigate which nutrition recommendations did women apply at household level after participating in nutrition education
- To identify enablers, difficulties and hindrances regarding the application of nutrition recommendations at household level after participating in nutrition education.

This study was undertaken within the multi-sectoral Welthungerhilfe (WHH) project 'Support for children and their caregivers living in extreme poverty in Karamoja/North-East Uganda'. The project that runs till July 2019 is also referred to by local people as the 'tereska' project. The overall aim of the project is to contribute to increased food security and self-reliance of the most vulnerable households in the Karamoja region.

Research design and methods

Study setting and participants

The 'tereska' project consisted of different components that address underlying objectives of malnutrition by means of different activities on agriculture, Water, Sanitation and Hygiene (WASH), education, sustainability and a nutrition component. This study here was embedded within the nutrition component.

A quantitative study was carried out with women in the two project villages of Nadunget sub-county. In total, 62 women participated in the study, 31 living in Kanakomol and 31 in Nabokat. The study sample of this research was predetermined, based on a nutrition study that was conducted by WHH in July 2017. This intervention research study included a nutrition education intervention as well as a

quantitative baseline and endline survey, using standardised and open questions. Baseline survey was undertaken prior to the first nutrition session in February 2018. Data on socio-demographic characteristics of the household were collected using pre-tested semi-structured questionnaires through face-to-face interviews with caregivers (women). Three weeks after finalisation of the last nutrition session an endline survey was conducted in April 2018. Enabling factors, difficulties and hindrances with regard to each nutrition recommendations application were assessed from all nutrition education participants. Figure 1 presents the overall study design.

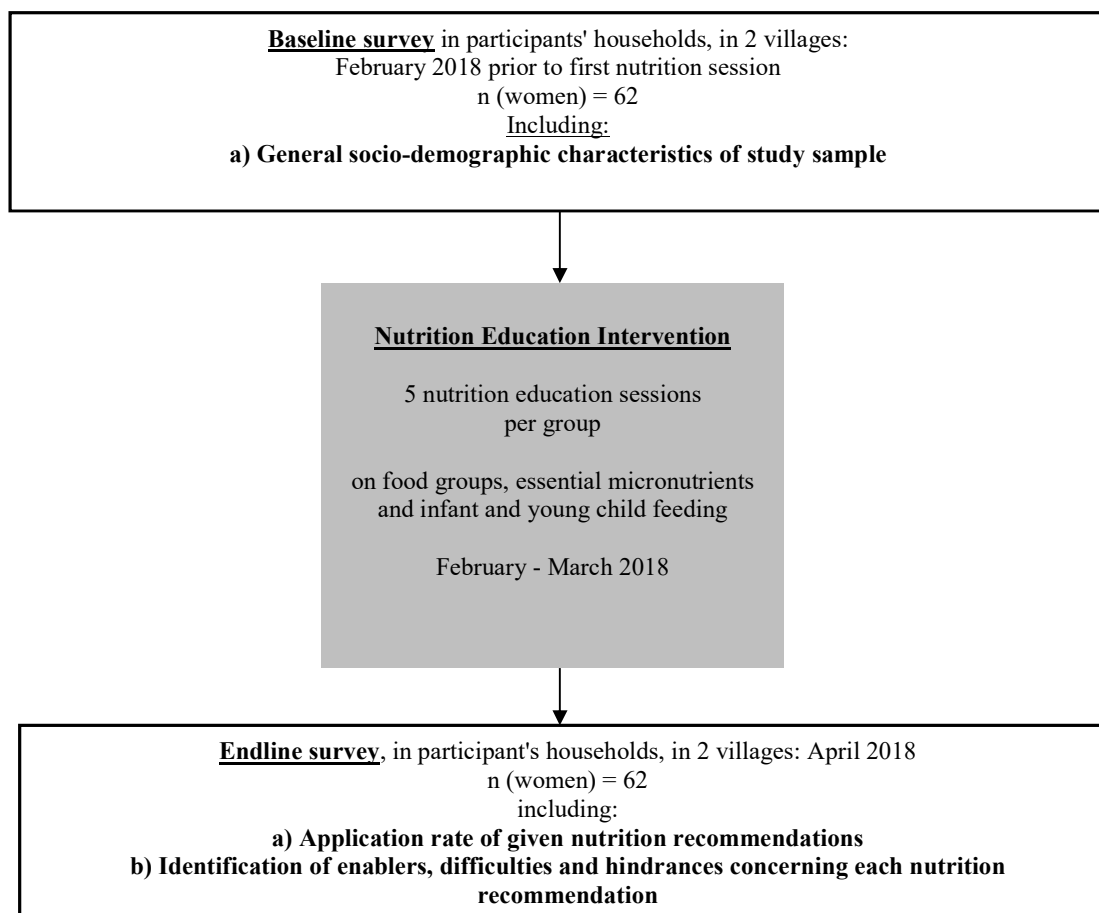


Figure 1: Study flow of intervention study and including data collection tools.

The intervention

The nutrition education intervention was designed as a series of five facilitated sessions, each lasting between three to four hours. Every session was held twice at one day, including 31 women in the morning and 31 women in the afternoon. Nutrition sessions were held weekly from February till March 2018. The sessions were included within the framework of an eight-week lasting business skills training that lasted from January till March 2018. The training was organised by the non-governmental organisation (NGO) called 'Cooperation and Development' (C&D) in collaboration with WHH. Nutrition sessions were held in a centrally located venue called 'Naoi Homebased Care' situated close to both villages. During the time of the training, provision of lunch, a short tea break either in the morning or afternoon as well as child care, were ensured. The intervention consisted of five nutrition education sessions which were participatory and included both group trainings and a participatory cooking demonstration. The themes and topics of the nutrition education sessions were selected based on results from a literature review and 'The Nutrition Study Karamoja' (Glas & Jordan, 2017), that served as a crucial work for understanding nutrition-related problems, specific for the region. The latter study was also funded by WHH as a response to the

critical situation in the region. Furthermore, results from Focus Group Discussions (FGDs) that were undertaken with participants prior to the first session (results presented elsewhere), supported the selection of topics and themes. Each session was planned in collaboration between the main research investigator (nutritionist), main project facilitator (WHH staff from field office Moroto) and the nutrition advisor from WHH. The content of the five nutrition sessions compriseded different topics and key messages: Introduction of food groups, seasonal food availability calendar, nutritional values of different food groups, crucial micronutrients, nutrition during pregnancy, Infant and Young Child Feeding (IYCF) and family planning. A participatory cooking session on nutritious foods for pregnant and lactating women as well as on IYCF was also included (table 2). Recipes were taken from a developed booklet that was designed during a former project - called RWANU - within the Karamoja region. This was done to enhance cultural acceptance and feasibility of dishes. Cooking utensils and ingredients were partly contributed by the participating women and WHH. The content that were addressed and implemented during the nutrition education are explained in more detail in table 2.

Table 2: Content of nutrition education sessions as applied in this study.

| Session | Topic | Materials used |
|---------|---|---|
| 1 | Introduction of the five food groups Introduction of crucial micronutrients ((Pro-)vitamin A, iron) Development season food availability calendar | Power Point slides with images White paper, pens, tape, flip chart |
| 2 | Revision of food groups and crucial micronutrients Introduction of essential nutrients Different forms of malnutrition and its prevention How to plan a good meal Provision of specific nutrition messages (1) - (5) | Power Point slides with images Food group images Food item cards Flip chart, pens |
| 3 | Cycle of maternal nutrition Exclusive breastfeeding Complementary feeding ages (6-8, 9-11., 12-23 months) - F-A-T-V-A-H characteristics Demonstration energy needs Demonstration porridge consistency Provision specific nutrition messages (6)-(10) | Power Point slides with images Counselling cards White paper, pens, tape, flip chart Empty bottles (to demonstrate size of stomach) Cooked porridge |
| 4 | Participatory cooking session Nutritious meals for pregnant and lactating women Nutritious meals as complementary feeds Revision of essential nutrients (provided by ingredients) - in group presentations | Recipe book Cooking utensils, firewood Ingredients for recipes Food group images |
| 5 | Overall review of all sessions Family planning (external lecturer from C&D) Preparation for graduation | Power Point slides with images Food group images Food item cards Counselling cards Flip chart, pens |
| 6 | Graduation ceremony with hand-over of certificates and common meal | |

(1) Include locally available iron-rich foods; (2) Combine yellow and orange fruits with your meal when eating iron-rich foods; (3) Avoid drinking coffee or tea up to 1-2 hours after having eaten iron-rich foods; (4) Include locally available (pro-)vitamin A-rich foods; (5) Add little fat or oil when using (pro-)vitamin A-rich foods (6) Include various foods in diet; (7) Exclusively breastfeed your child for the first six months; (8) Try to include two additional meals during the liquids during the day; (9) Drink enough non-alcoholic liquids during the day; (10) Provide porridge to your child that is thick enough to stay at the spoon

Endline survey

During endline the main focus was set on investigating in enablers, difficulties and hindrances concerning each nutrition recommendations application. The box below provides an overview on all nutrition recommendations given during nutrition sessions.

Overview on nutrition recommendations:

- 1 Include locally available iron-rich foods.
- 2 Combine yellow and orange fruits with your meal when eating iron-rich foods.
- 3 Avoid drinking coffee or tea up to 1-2 hours after having eaten iron-rich foods.
- 4 Include locally available (pro-) vitamin A-rich foods.
- 5 Add little fat or oil when using (pro-) vitamin A-rich foods.
- 6 Include various foods in your diet.
- 7 Exclusively breastfed your child for the first six months.
- 8 Try to include two additional meals during the period of breastfeeding.
- 9 Drink enough non-alcoholic liquids during the day.
- 10 Provide porridge to the child that is thick enough to stay on the spoon.

Firstly, women were asked whether they tried to adopt the respective recommendation at household level. If answered with yes, enumerator investigated whether application was difficult or easy. In case it was easy, enabler was tried to be identified, when asking why. When regarded as difficult, difficulty was tried to identify, when asking why. In case initial question was answered with 'no', hindrances were investigated in while asking why recommendation was not even tried out (figure 2).

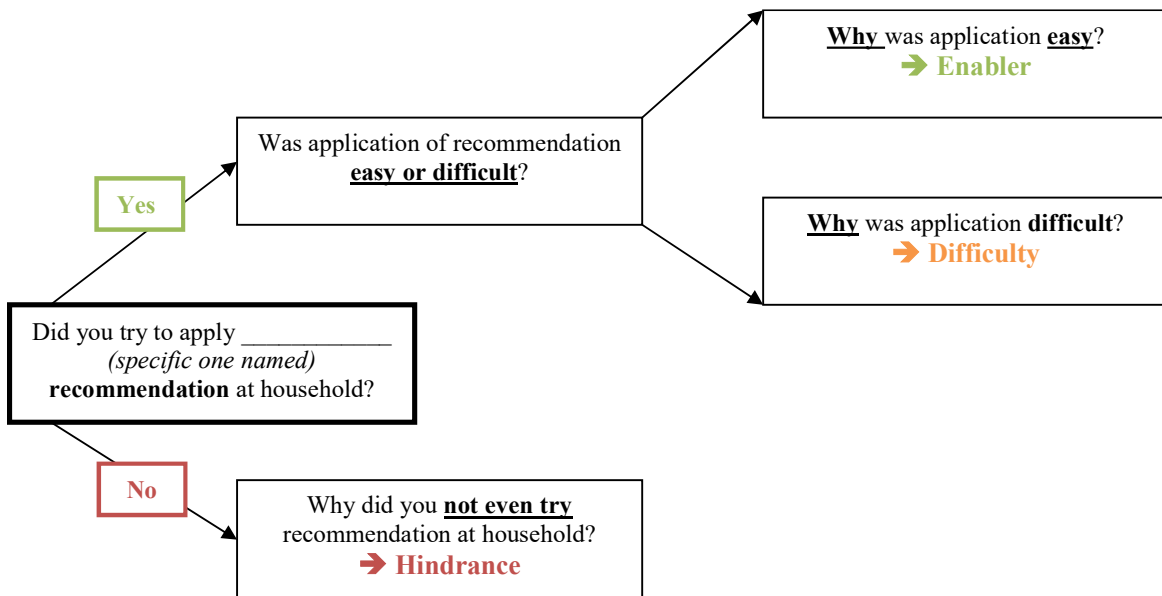


Figure 2: Exemplary skip question used for investigating in enabler, difficulties and hindrances of nutrition recommendations application during endline survey.

Data management and analysis

Data from paper questionnaire during baseline survey were entered in Microsoft Excel 2007, whereas endline data, gathered through tablets, were automatically generated in an Excel file. Daily quality assurance of data was usually undertaken after finalisation of the last interview. Both data sheets were converted into IBM SPSS Statistics 23 software. All statistic analyses were performed using IBM SPSS Statistic 23 software. Variables were defined and codified. Descriptive analysis, mainly including frequencies as well as mean, median, standard deviation, minimum and maximum were calculated for socio-demographic data and application rates of nutrition recommendations amongst others.

Results

During the baseline survey, socio-demographic data were assessed and 62 women were interviewed in Kanakomol (n= 31) and Nabokat (n= 31). Mean age of women was 38 (± 16) years. Participating women from Nabokat (41 ± 17 years) were slightly older than from Kanakomol (35 ± 15 years). Majority of women never attended school (80.6%). More women from Nabokat, compared to Kanakomol never attended school (90.3% vs. 80.6%). About 14.5% of the women finished primary 1-3 and 4.8% primary 4-7. More information on socio-demographic characteristics are provided in table 3.

Table 3: Main household characteristics at baseline.

| | Total (N= 62) | | Kanakomol (N= 31) | | Nabokat (N= 31) | |
|-----------------------------------|------------------|---------------------|----------------------|---------------------|--------------------|---------------------|
| | n | mean (\pm SD) | n | mean (\pm SD) | n | mean (\pm SD) |
| Age of women (years) | 58 | 38 (16) | 31 | 35 (15) | 27 | 41 (17) |
| Household size | 62 | 6 | 31 | 5.8 (1.9) | 31 | 5.9 (1.8) |
| Household head | n | % | n | % | n | % |
| male | 30 | 48.4 | 16 | 51.6 | 14 | 45.2 |
| female | 31 | 50.0 | 15 | 48.4 | 16 | 51.6 |
| both | 1 | 1.6 | 0.0 | 0.0 | 1 | 3.2 |
| Marital status women | | | | | | |
| married monogamous | 25 | 40.3 | 12 | 38.7 | 13 | 41.9 |
| married polygamous | 18 | 29 | 10 | 32.3 | 8 | 25.8 |
| widowed | 15 | 24.2 | 7 | 22.6 | 8 | 25.8 |
| divorced/separated | 3 | 4.8 | 1 | 3.2 | 2 | 6.5 |
| never been married | 1 | 1.6 | 1 | 3.2 | 0.0 | 0.0 |
| Educational level women | | | | | | |
| University | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Vocational training | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| A-Level | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| O-Level | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Primary (4-7) | 3 | 4.8 | 3 | 9.7 | 0.0 | 0.0 |
| Primary (1-3) | 9 | 14.5 | 6 | 19.4 | 3 | 9.7 |
| No school | 50 | 80.6 | 22 | 71.0 | 28 | 90.3 |
| Primary sources of income* | | | | | | |
| Selling charcoal/firewood | 36 | 58.1 | 15 | 48.4 | 21 | 67.7 |
| Casual labour | 49 | 79.0 | 23 | 74.2 | 26 | 83.9 |
| Own business | 11 | 17.7 | 5 | 16.1 | 6 | 19.4 |
| Quarrying/mining | 21 | 33.9 | 17 | 54.8 | 4 | 12.9 |
| Farming of crops | 21 | 33.9 | 12 | 38.7 | 9 | 29.0 |
| Housemaid | 4 | 6.5 | 1 | 3.2 | 3 | 9.7 |
| Brewing/selling of alcohol | 10 | 16.1 | 4 | 12.9 | 6 | 19.4 |

Table 4 provides an overview on the application rate of single nutrition recommendations as well as main enablers, difficulties and hindrances identified (see Appendix A for whole set of reasons identified). Main enablers were affordability (financial means generally given), availability, knowledge gain from nutrition education and temporary financial means (if money is sometimes given). Common difficulty and hindrance mentioned was affordability (financial means generally not given). An additional hindrance identified was alcohol consumption.

Concerning application rates, the inclusion of locally available iron-rich (No. 1) and (pro-)vitamin A-rich foods (No. 4) as well as adding little fat or oil, when using (pro-)vitamin A-rich foods (No. 5), were the most applied nutrition messages. The majority of participants stated that they were easy in application (No. 1 - 86.9%, No. 4 - 98.3%, No. 5 - 90.0%). No. 2, 3 and 6 were also carried out by more than 80.0%, while No. 3 - avoiding drinking coffee or tea up to 1-2 hours after having eaten iron-rich foods - was perceived as easy in application by all participants who implemented the recommendation at household level. Exclusive breastfeeding for the first six months (No. 7) and inclusion of two additional meals during period of breastfeeding (No. 8) were implemented by 72.6% and 50.0% respectively. Nearly two out of three women (61.3%) stated having drunk sufficient non-alcoholic drinks during the day, and that the provided porridge was thick in consistency. None of the participants perceived provision of thick porridge as difficult.

Table 4: Overview on selected enabler, difficulties and hindrances with regard to nutrition recommendations that were given during nutrition education.

| Nutrition recommendations | Application rate | Main enabler* | | | | | Main difficulty* | | Main hindrance* | | |
|--|------------------|---------------------|----------------------------|--------------|-------------------------|-----------------------------|--------------------------|----------------------------|-----------------|----------------------------|---------------------|
| | | Easy in application | Affordability (in general) | Availability | Knowledge gain training | Affordability (temporarily) | Difficult in application | Affordability (in general) | No application | Affordability (in general) | Alcohol consumption |
| | [%] (n) | n | | | | | n | | n | | |
| 1 Include locally available iron-rich foods. | 98.4 (61) | 53 | 19 | 34 | 1 | 12 | 8 | 8 | 1 | 0 | 0 |
| 2 Combine yellow and orange fruits with your meal when eating iron-rich foods. | 80.6 (50) | 46 | 13 | 16 | 1 | 10 | 4 | 3 | 12 | 10 | 0 |
| 3 Avoid drinking coffee or tea up to 1-2 hours after having eaten iron-rich foods. | 80.6 (50) | 50 | 1 | 0 | 9 | 0 | 0 | 0 | 12 | 0 | 0 |
| 4 Include locally available (pro-) vitamin A-rich foods. | 96.8 (60) | 59 | 14 | 44 | 0 | 7 | 1 | 1 | 2 | 2 | 0 |
| 5 Add little fat or oil when using (pro-) vitamin A-rich foods. | 96.8 (60) | 54 | 35 | 3 | 4 | 6 | 6 | 6 | 2 | 2 | 0 |
| 6 Include various foods in your diet. | 88.7 (55) | 46 | 13 | 10 | 14 | 7 | 9 | 6 | 7 | 6 | 0 |
| 7 Exclusively breastfed your child for the first six months. | 72.6 (45) | 40 | 0 | 0 | 11 | 0 | 5 | 0 | 17 | 0 | 0 |
| 8 Try to include two additional meals during the period of breastfeeding. | 50.0 (31) | 26 | 3 | 4 | 17 | 2 | 5 | 5 | 31 | 0 | 0 |
| 9 Drink enough non-alcoholic liquids during the day. | 61.3 (38) | 36 | 0 | 24 | 8 | 0 | 2 | 2 | 24 | 18 | 5 |
| 10 Provide porridge to the child that is thick enough to stay on the spoon. | 61.3 (38) | 38 | 0 | 1 | 34 | 0 | 0 | 0 | 24 | 0 | 0 |

* multiple answers possible

Discussion

The nutrition education aimed to provide nutrition recommendations to improve the diversity of women's and their children's diet as well as to assess enabling and hindering factors concerning recommendations' application. In this study, application rates of nutrition recommendations were high. Application rates were partly cross-checked with dietary intakes of women (results presented elsewhere) and are likely to be slightly lower than they appear.

Affordability in general or temporarily, availability and knowledge gain from nutrition education were the main enablers identified. This can be attributed to two main reasons, the conceptualisation of the nutrition education intervention and the enabling environment, both positively influencing each other. The nutrition education intervention was designed, applying a context-specific behaviour change strategy, based on formerly undertaken research. The research was not only of scientific manner, but also actively involved future participants of the intervention, investigating in current practices and knowledge, as well as their expectations on the upcoming intervention. Due to this, contents were mainly based on participants' expectations, and improper practices revealed. Revealed knowledge gaps were addressed, explaining the fact that knowledge gain was named as a main enabler in the application of recommendations. Participants also showed satisfying knowledge scores after having participated in the intervention (results presented elsewhere). Prior to each session, contents were always discussed with the experienced facilitator (WHH staff from field office Moroto) with regard to feasibility and cultural appropriateness for participants. Recommendations were further chosen in order to be not subjected to financial constraints. Within this context, the enabling environment mattered. Due to several ongoing and former project activities from WHH, women had easy access to a water source close by, cultivated own produces in the kitchen garden or even some possessed own livestock, such as goats or poultry. The created enabling environment therefore possibly contributed to the mentioned enabler of 'availability'. Context-specificity, cultural appropriateness and involvement of different components, such as information provision and skills training, that aim at behaviour change, were confirmed in its effectiveness in comparable settings too (Hawkes, 2013; Locks *et al.*, 2015).

Recommendation 10 (Provide porridge that is thick enough to stay on the spoon) stood out, due to the fact, that knowledge gain from nutrition education, was named as the main enabling reason (89.5%) during the endline survey. Porridge consistency was repeatedly involved in the training and found further emphasis through demonstrations and during the participatory cooking session. Due to demonstrations and own involvement during the participatory cooking session, women could also gather first-hand experiences in preparing the 'thicker' porridge themselves. The positive effect of the cooking demonstrations was also confirmed during an intervention in Kenya and Ethiopia, outlining its positive impact on the expected number of IYCF practices, that increased by 39%, holding other personal and psychosocial factors constant (Mutiso *et al.*, 2018; Kim *et al.*, 2015).

Affordability, meaning that financial means were generally not given, was the main difficulty and hindrance identified. Financial constraints played a crucial role in Karamoja, also due to the fact that Karamoja is considered as the least developed Ugandan sub-region, where more than 80% are living below the national poverty line of \$1.90 per person per day (World Bank, 2018; Mathys *et al.*, 2017). Given these difficult circumstances, it also becomes clear that the conceptualised nutrition education intervention possibly did not offer affordable and appropriate recommendations for all its participants. Furthermore, priorities on how to spend money can also have played a crucial role. Besides expenditure on food, there are many other bills to pay, such as school fees. Apart from this, alcohol consumption is still widely spread, as observed during field visits and as indicated in the literature, where its role as 'liquid food' was also pointed out (Dancause *et al.* 2010). With regard to hindrances, alcohol was also mentioned as a difficulty and hindrance alike, when it comes to the consumption of sufficient non-alcoholic drinks (Rec. 9), again underlining its implications on nutrition.

In a nutshell, difficulties and hindrances of nutrition recommendations application at household are mainly linked to financial constraints. In order to conceptualise a successful nutrition education intervention, possible financial constraints of participants ought to be taken into account.

Conclusions

Nutrition Education embedded in a multi-sectoral approach provided a good platform for provisioning specific nutrition recommendations. Understanding women's perceptions on nutrition recommendations application can shed light on enabling and hindering factors for putting gained knowledge into practice. Revealed enablers, such as affordability or knowledge gain from training and hindrances, e.g. affordability or high alcohol consumption, can help to adapt future project interventions.

References

- Dancause, K. N., Akol, H. A., Gray, S. J. 2010. Beer is the cattle of women. *Social science & medicine* (1982) 70 (8): 1123–1130.
- Food and Agriculture Organization of the United Nations (FAO) 2018. The state of food security and nutrition in the world 2018. <http://www.fao.org/3/I9553EN/i9553en.pdf> (accessed on 02.03.2019).
- Garg, A., Kashyap, S. 2006. Effect of counseling on nutritional status during pregnancy. *The Indian Journal of Pediatrics* 73 (8): 687–692.
- Glas, M. G. and Jordan, I. 2017. Final Draft Report Nutrition Study Karamoja (not published).
- Hawkes, C. 2013. Promoting healthy diets through nutrition education and changes in the food environment: An international review of actions and their effectiveness. <http://www.fao.org/3/i3235e/i3235e.pdf> (accessed on 08.11.2018).
- Ickes, S. B., Baguma, C., Brahe, C. A. et al. 2017. Maternal participation in a nutrition education program in Uganda is associated with improved infant and young child feeding practices and feeding knowledge. *BMC Nutrition* 3 (1): 427.
- Kim, S. S, Ali, D., Kennedy, A. et al. 2015. Assessing implementation fidelity of a community-based infant and young child feeding intervention in Ethiopia identifies delivery challenges that limit reach to communities. *BMC Public Health* (15): 316.
- Locks, L. M., Pandey, P. R., Osei, A. K. et al. 2015. Using formative research to design a context-specific behaviour change strategy to improve infant and young child feeding practices and nutrition in Nepal. *Maternal & child nutrition* 11 (4): 882–896.
- Mathys E., Cashin K, Sethuraman K. 2017. USAID Office for Food for Peace Food Security Desk Review for Karamoja, Uganda. <https://www.fantaproject.org/sites/default/files/resources/FANTA-Food-Security-Desk-Review-for-Karamoja-Uganda-Jan2017.pdf> (accessed on 20.11.2018).
- Mutiso, J. M., Okello, J. J., Lagerkvist, C. J. et al. 2018: Effect of nutrition education and psychosocial factors on child feeding practices. *Ecology of food and nutrition* 57 (4): 346–371.
- Uganda Bureau of Statistics (UBOS) and ICF. 2018. Uganda Demographic and Health Survey 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf> (accessed on 20.11.2018).
- Waswa, L. M., Jordan, I., Herrmann, J., Krawinkel, M. B., Keding, G. B. 2015. Community-based educational intervention improved the diversity of complementary diets in western Kenya. *Public health nutrition* 18 (18): 3406–3419.

World Bank. 2013. Improving nutrition through multisectoral approaches.
[http://documents.worldbank.org/curated/en/625661468329649726/pdf/75102-
REVISED-PUBLIC-MultisectoralApproachestoNutrition.pdf](http://documents.worldbank.org/curated/en/625661468329649726/pdf/75102-REVISED-PUBLIC-MultisectoralApproachestoNutrition.pdf) (accessed on 20.11.2018).

World Bank (2018): The World Bank in Uganda.
<http://www.worldbank.org/en/country/uganda/overview#2> (accessed on 20.11.2018).

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Appendix A: Overview on enablers, difficulties and hindrances of recommendation's application at household level.

| | Rec. 1⁽¹⁾ [%] (n) | Rec. 2⁽²⁾ [%] (n) | Rec. 3⁽³⁾ [%] (n) | Rec. 4⁽⁴⁾ [%] (n) | Rec. 5⁽⁵⁾ [%] (n) | Rec. 6⁽⁶⁾ [%] (n) | Rec. 7⁽⁷⁾ [%] (n) | Rec. 8⁽⁸⁾ [%] (n) | Rec. 9⁽⁹⁾ [%] (n) | Rec. 10⁽¹⁰⁾ [%] (n) |
|--|--|--|--|--|--|--|--|--|--|--|
| Main <u>enablers</u>** for application | n* = 59 | n = 48 | n = 51 | n = 68 | n = 58 | n = 54 | n = 47 | n = 28 | n = 41 | n = 40 |
| Affordability (financial means generally given) | 18.9 (19) | 28.9 (13) | 2.1 (1) | 23.7 (14) | 64.8 (35) | 28.3 (13) | 0 | 11.5 (3) | 0 | 0 |
| Availability | 64.2 (34) | 35.6 (16) | 0 | 74.6 (44) | 5.6 (3) | 21.7 (10) | 0 | 15.4 (4) | 66.7 (24) | 2.6 (1) |
| Knowledge gain from training | 1.9 (1) | 2.2 (1) | 18.8 (9) | 0 | 7.4 (4) | 30.4 (14) | 27.5 (11) | 65.4 (17) | 22.2 (8) | 89.5 (34) |
| If financial means are given (temporarily) | 22.6 (12) | 22.2 (10) | 0 | 11.9 (7) | 11.1 (6) | 15.2 (7) | 0 | 7.7 (2) | 0 | 0 |
| Seasonality | 0 | 17.8 (8) | 0 | 5.1 (3) | 0 | 8.7 (4) | 0 | 0 | 0 | 0 |
| Taste | 1.9 (1) | 0 | 0 | 0 | 7.4 (4) | 13.0 (6) | 0 | 0 | 0 | 0 |
| Preparation | 1.9 (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.2 (5) |
| No sugar available for drinking tea | 0 | 0 | 43.8 (21) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Either tea or food consumption | 0 | 0 | 10.4 (5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Does not like drinking tea | 0 | 0 | 31.3 (15) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Own oil production | 0 | 0 | 0 | 0 | 5.6 (3) | 0 | 0 | 0 | 0 | 0 |
| Availability of breast milk | 0 | 0 | 0 | 0 | 0 | 0 | 65.0 (26) | 0 | 0 | 0 |
| Always together with child | 0 | 0 | 0 | 0 | 0 | 0 | 15.0 (6) | 0 | 0 | 0 |
| If no money for alcohol | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.6 (2) | 0 |
| Main <u>difficulties</u>*** for application | n = 8 | n = 4 | n = 0 | n = 1 | n = 6 | n = 9 | n = 5 | n = 5 | n = 4 | n = 0 |
| Affordability (no financial means generally given) | 100.0 (8) | 75.0 (3) | 0 | 100.0 (1) | 100.0 (6) | 66.7 (6) | 0 | 100.0 (5) | 50.0 (2) | 0 |
| Availability | 0 | 25.0 (1) | 0 | 0 | 0 | 22.2 (2) | 0 | 0 | 0 | 0 |
| Seasonality | 0 | 0 | 0 | 0 | 0 | 11.1 (1) | 0 | 0 | 0 | 0 |
| Doesn't want to breastfeed | 0 | 0 | 0 | 0 | 0 | 0 | 20.0 (1) | 0 | 0 | 0 |
| No breastmilk | 0 | 0 | 0 | 0 | 0 | 0 | 20.0 (1) | 0 | 0 | 0 |
| Sickness of child | 0 | 0 | 0 | 0 | 0 | 0 | 40.0 (2) | 0 | 0 | 0 |
| Absence of mother | 0 | 0 | 0 | 0 | 0 | 0 | 20.0 (1) | 0 | 0 | 0 |
| Positive attitude towards alcohol | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50.0 (2) | 0 |

| | Rec. 1 ⁽¹⁾ [%] (n) | Rec. 2 ⁽²⁾ [%] (n) | Rec. 3 ⁽³⁾ [%] (n) | Rec. 4 ⁽⁴⁾ [%] (n) | Rec. 5 ⁽⁵⁾ [%] (n) | Rec. 6 ⁽⁶⁾ [%] (n) | Rec. 7 ⁽⁷⁾ [%] (n) | Rec. 8 ⁽⁸⁾ [%] (n) | Rec. 9 ⁽⁹⁾ [%] (n) | Rec. 10 ⁽¹⁰⁾ [%] (n) |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| Main hindrances**** for application | n = 1 | n = 13 | n = 12 | n = 2 | n = 2 | n = 7 | n = 17 | n = 20 | n = 24 | n = 19 |
| Affordability (no financial means generally given) | 0 | 83.3 (10) | 0 | 100 (2) | 100 (2) | 85.7 (6) | 0 | 0 | 75.0 (18) | 0 |
| Availability | 0 | 25.0 (3) | 0 | 0 | 0 | 0 | 0 | 0 | 4.2 (1) | 0 |
| Seasonality | 100.0 (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No sugar available for drinking tea | 0 | 0 | 41.7 (5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Does not like drinking tea | 0 | 0 | 41.7 (5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Usually cooking only one type of food | 0 | 0 | 0 | 0 | 0 | 14.3 (1) | 0 | 0 | 0 | 0 |
| No child within breastfeeding age | 0 | 0 | 0 | 0 | 0 | 0 | 94.1 (16) | 100.0 (20) | 0 | 78.9 (15) |
| Soft foods available for child | 0 | 0 | 0 | 0 | 0 | 0 | 5.9 (1) | 0 | 0 | 0 |
| Positive attitude towards alcohol | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20.8 (5) | 0 |
| Child has difficulties in swallowing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21.1 (4) |

* n: indicates numbers of answers given (multiple responses possible); not all given answers displayed in table

** Enablers within this context are reasons why application of given recommendation was tried and regarded as easy

*** Difficulties within this context are reasons why application of given recommendation was implemented and regarded as difficult

**** Hindrances within this context are reasons why respondent did not even try implementation of recommendations

0 indicates that reason does not fit within context of given recommendation and/or not mentioned by respondent

(1) Include locally available iron-rich foods

(2) Combine yellow and orange fruits with your meal when eating iron-rich foods

(3) Avoid drinking coffee or tea up to 1-2 hours after having eaten iron-rich foods

(4) Include locally available (pro-)vitamin A-rich foods

(5) Add little fat or oil when using (pro-)vitamin A-rich foods

(6) Include various foods in diet

(7) Exclusively breastfeed your child for the first six months

(8) Try to include two additional meals during the liquids during the day

(9) Drink enough non-alcoholic liquids during the day

(10) Provide porridge to your child that is thick enough to stay at the spoon