

The Outcomes of Community Based Nutrition Education Interventions in Addressing Under-five Child Malnutrition in Namalu Sub County in Nakapiripirit district

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ABSTRACT

The study is to examine the outcomes of community based nutrition education interventions in addressing under-five child malnutrition in Namalu Sub County in Nakapiripirit district. The study was motivated by persistent high levels of child malnutrition in the sub region. Using a cross-sectional survey design, data were collected from 362 households using questionnaires. The study also used Focus Group Discussions (FGDs) and Key informant interviews to collect qualitative data. This study found that almost three quarters of the child caretakers had accessed community-based nutrition education programs mainly from health workers from government owned health facilities who educated mothers and child caretakers during routine integrated community medical outreaches and camps. UN agencies like WFP and UNICEF as well as other NGOs also supported and implemented the community-based education interventions in the study area. Overall, the interventions seem to be well implemented by the partners and was effective in improving under five child nutrition in the Namalu Sub County in Nakapiripirit district. In this study, it was established that home visits were the most effective methods of delivering community-based nutrition education interventions while mass media and Information, Education, and Communication (IEC) material were the least effective because most people did not have access to radio and Television and could not read the IEC material because of low literacy levels. The study found that community-based education nutrition improved the nutritional knowledge and practices among the caretakers as well as the nutrition status of children under five years of age in the study area. The study concluded that community-based nutrition education improves under five child nutrition. It is recommended that the implementing partners should improve the delivery of the intervention to enhance its effectiveness in improving under five child nutrition status.

Keywords: Child malnutrition, nutrition education, NGOs and Interventions

INTRODUCTION

Under nutrition among children under 5 years of age is still a public health concern globally. It is estimated that 165 million were stunted, 101 million were underweight, and 52 million were wasted, in 2011, with high prevalence levels of under nutrition in Africa (36%) and Asia (27%) [1]. In Uganda, 33% are stunted, 14% are underweight, and 5% are wasted with notably high prevalence in the South-Western and the Namalu Sub County in Nakapiripirit district of Uganda [2].

Under-five malnutrition directly and indirectly contributes to up to 60% of child mortality [3]. Childhood stunting is an indicator of chronic malnutrition and is associated with compromised cognitive development and educational performance [3]. The factors that contribute to under-5 malnutrition include large household sizes, unsteady

income flow, age of introducing supplementary foods, lack of information on childcare, and poor sanitation. Furthermore, the immediate causes of under-5 malnutrition in developing nations continue to be the high disease burden from malaria fever (40%), diarrheal disease (23%), acute respiratory infections (15%), and inadequate dietary intake resulting from suboptimal infant feeding practices [4].

The prevalence of acute malnutrition (wasting) in Uganda among children 6 to 59 months of age is 4% and 10% for West Nile sub region, refugee humanitarian settings, where refugees from South Sudan and Congo are harboured [5]. The condition varied with different regions, highest in the western region particularly Tooro sub region with 41% and lowest in the Teso sub-region with 14% [6]. This is

higher than the World Health Assembly's target to reduce and maintain the prevalence of wasting in children to less than 5% by 2025 [7]. Underweight was also mostly recorded in the rural areas particularly the Karamoja regions where the percentage was the highest (26%) [8]. The possible reason for this in Karamoja is that it is a conflict zone which can affect food circulation, transportation, and cultivation. The nomadic lifestyle in the region could also be a possible contributory factor. Prevalence of stunting also varied with the mother's level of education and wealth status [9]. With the national context, Karamoja is often referred to as the least developed part of the country. It's a semi-arid area of northern Uganda comprised of 9 districts. It has a population of 1.37 million people who are primarily pastoralists and agro-pastoralists [10]. The Karamoja region has suffered from recurrent food insecurity and stagnating high levels of malnutrition influenced by a number of factors, such as, increasingly frequent and severe natural disaster, especially droughts, and the combination of frequent natural disasters, cattle rustling violence, severe environmental degradation, poor infrastructure, high poverty rates and weak agriculture that have eroded people's capacity to cope and left them structurally vulnerable to hunger [11]. As a result, relatively small shocks have led to high levels of acute malnutrition. The people of Karamoja also experience high disease incidence, have poor sanitation and hygiene facilities and practices, and feed their infants and young children poorly. Over 80 percent of the population in Karamoja lives below the poverty line and the region suffers from low levels of education and literacy rates at 12 percent compared to national level of 7% [12]. The Uganda Demographic Health Survey (2016) indicated that Karamoja sub region has the poorest nutrition indicators for women and children. According to this report, among children below 5 years of age, 35% were stunted, 10.0% were wasted, 25.8% were underweight, and 67.7% had anaemia. The report also indicated that 32% of women of childbearing age were anaemic [10]. The region's infant mortality rate of 87/1,000 live births exceed the national level of 54/1,000 [4]. The under-five mortality rate and maternal mortality ratio also exceed national levels of 42.12/1000 [7].

In addition to the highest level of stunting (45%), Dietary diversity, an indicator associated with diet adequacy, is very low in Karamoja region [5]. Among young children (6 to 23 months) only 5.8% meet the criteria for a minimum acceptable diet due to food security and poor feeding practices [1]. Female headed households are poorer and more food insecure as most women have unequal rights and limited access to productive and financial resources that affect food access at household level [8].

Poor nutrition knowledge is one of the main factors in the development of malnutrition and needs to be addressed [6]. One of the factors influencing nutritional status is a lack of education and nutritional knowledge. One strategy that has been employed to address poor nutritional intake is nutrition education. This can be defined as "any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviours conducive to health and wellbeing" [3]. Nutrition education programs designed based on a multi-media approach using print/audio-visual media, discussions targeted at mothers, among others in Uganda have been designed and implemented. For instance, in Karamoja sub region, programs targeting parents, caregivers under community-based supplementary feeding programs (CBSFP) and maternal child health and nutrition (MCHN) intending to address acute malnutrition have been implemented [10].

Nutrition education, when combined with the access to nutritious, high-quality food already provided, is an effective strategy to encourage healthy eating behaviours, and improve child health outcomes [11]. Furthermore, it has been found to be an evidence-based cost-effective way to health outcomes and can foster healthy eating habits for a lifetime [9]. When nutrition education is done in a community/group education setting, it yields a wider variety of positive results than individual education settings [1].

In Nakapiriprit, a district located in northeastern Uganda, significant efforts and resources have been invested in nutrition education at community, institution level including health units/service providers, packaged along with health programs as one of the avenues intended to contribute to reduction and prevention of malnutrition. However, assessments over the last five

years still reflect high malnutrition levels in Karamoja [6]. This leaves questions to be answered on how effective nutrition education interventions in the sub region are. Some researchers have documented a significant relationship between nutrition knowledge and nutrition behaviour and other studies have revealed that interventions focused on behavioural change and based on appropriate research into the target population and behaviour change theory were more effective than those simply focusing on the provision of information [3]. Therefore, there was a need to review the interventions in Karamoja to establish the gap in the approaches of implementation being used.

The study employed [6] Diffusion of Innovation Theory to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour, or product. The theory was used to explain how, over time, the ideas spread through community-based nutrition education interventions gain momentum and diffuse (or spreads) through the study population and the impact of these interventions in addressing child malnutrition in the Karamoja Sub Region.

Statement of the Problem

Karamoja has suffered from recurrent food insecurity and stagnating high levels of malnutrition influenced by several factors, such as, increasingly frequent and severe natural disasters, especially droughts coupled with, cattle rustling violence, severe environmental degradation, poor infrastructure, high poverty rates and weak agriculture that have eroded people's capacity to cope and left them structurally vulnerable to

Study Design

The study adopted a descriptive cross-sectional design because it enables systematic collection of data and reporting of various approaches of community nutrition education programs by various stakeholders and their effectiveness at one point in time [3].

The study adopted mixed methods research approaches where it used both quantitative and qualitative approaches to allow collection of

hunger (WFP, 2016). As a result, relatively small shocks have led to high levels of acute malnutrition. The people of Karamoja also experience high disease incidence, have poor sanitation and hygiene facilities and practices, and feed their infants and young children poorly. Over 80% of the population in Karamoja lives below the poverty line and the region suffers from low levels of education and literacy rates at 12 percent compared to national level of 71% (UBOS, 2017). In Nakapiripirit, 1 in 3 children still experience stunted development due to malnutrition (UNICEF & WFP, 2019). This leaves questions to be answered on, how effective are the nutrition education interventions in the sub region. This study, therefore, sought to assess the outcomes of nutrition education in addressing under-five child malnutrition in the Karamoja Sub Region using a case study of Namalu Sub County in Nakapiripirit district.

Justification of the Study

Whereas child nutrition education interventions have been conducted in the Karamoja Sub Region, specifically in Namalu Sub County in Nakapiripirit district, there seems to be a paucity of empirical studies on the outcome of these interventions in the sub-region. It was, therefore, important that research on the outcomes of these interventions in the sub region is conducted in order to find out how the community-based nutrition education programs have impacted on the under-five child nutrition in the sub-region.

Aim of the study

The project aims at assessing the outcomes of community based nutrition education interventions in addressing under-five child malnutrition in Namalu Sub County in Nakapiripirit district.

METHODOLOGY

numerical and qualitative data and perform effective analysis using statistical procedures. Using the mixed methods approach was aimed at maximizing the strengths and minimizing the weaknesses of each of the approaches.

Study Setting

This study was carried out in in Namalu sub-county in Nakapiripirit district in the Karamoja region located in Northeastern Uganda. The district is bordered by Napak district to the

North, Moroto district to the Northeast, Amudat district to the East, Kween district to the Southeast, Bulambuli district to the Southwest, Kumi district to the West and Katakwi district to the Northwest [3]. Most of the population are Karamojong and the language spoken is Karamojong [1]. The main activity in the district is animal husbandry and the majority of the population are pastoralists. However, in some areas, especially in the south, some agricultural activity takes place [10]. The study focused on Kaiku Parish in Namalu Sub County in Nakapiripirit district because the area was affected by high levels of child malnutrition despite nutrition education by the government and development partners like the World Food Programme (WFP) through her partners.

Population and Sampling Techniques

The target population in this study consisted of all the households in Kaiku Parish and all the development partners supporting the community with nutrition interventions. The accessible population consisted of all the households with children under five years of age who benefited from the nutrition education interventions and those who did not benefit as well as the available development partners who operate in the area.

Study Population

Household population

The study population was comprised of all the 10020 households in Kaiku Parish in Nakapiripirit District. According to the records at the District

Planning Office, Kaiku parish in Nakapiripirit has total number of 10020 households. The study focus on the households at community level in order to assess the outcomes of the community-based nutrition education programs.

Development and Implementing Partners' Population

The study population was also composed of development partners from UN Agencies, local and international Non-Government Organisations (NGOs) government and local government operating in the Karamoja Sub Region. The study focused on the development partners in order to collect data on the different community-based nutritional education programs as well as the approaches used to implement these programs.

Sample size

Community/Household Sample Size

The sample size of the household targeted 373 respondents. The sample size was arrived at using the predetermined sample size Table by [4] as cited in Amin [1] formula for obtaining a proportionate sample allocation.

$$n_i = \frac{n \times N_j}{N}$$

N

n_i = Sample Size

n = sample size drawn from the population

N_j = Population of the cluster

N = Target Population drawn from the margin

Table 1: Sample Size Table

Category	Population (n)	$\frac{n \cdot N_j}{N}$	Sample Size (ni)
Nakuyon	2620	$\frac{2620}{10020} \cdot 373 =$	98
Naabore	1020	$\frac{1020}{10020} \cdot 373 =$	38
Nakipenet I	1272	$\frac{1272}{10020} \cdot 373 =$	47
Nakipenet Ii	1500	$\frac{1500}{10020} \cdot 373 =$	56
Nakipenet Iii	1051	$\frac{1051}{10020} \cdot 373 =$	39
Nakipenet Iv	957	$\frac{957}{10020} \cdot 373 =$	36
Nakipenet V	1200	$\frac{1200}{10020} \cdot 373 =$	44
Morua Loduk	400	$\frac{400}{10020} \cdot 373 =$	15
Total	10020 (Nj)		373 (N)

Source: Namalu Sub County Head Offices

**Sample Size for
Development/Implementing partners**

The sample size for the key informants consisted of 29 study respondents

who were drawn from development and implementing partners operating within the Karamoja sub-region as indicated in Table 2 below.

Table 2: Sample Size for the Key Informants

Agency	Population	Sample	Sampling Method	Data Collection Method
UN Agencies	2	2	Purposive	Key Informant Interviews
Central Government Programs	4	4	Purposive	Key Informant Interview
International NGOs and Development Partners	10	10	Purposive	Key Informant Interview
National NGOs	6	6	Purposive	Key Informant Interview
Local NGOs	6	6	Purposive	Key Informant Interview
Local Government	1	1	Purposive	Key Informant Interview
Total	29	29		

Source: Karamoja Donor Mapping Report 2019

Sampling Techniques and Procedures

Quantitative Sampling Techniques and Procedures

From each of the villages, households were proportionately selected to participate in the study using systematic sampling technique where every 5th household in the village with a child under five years was selected to participate in the study. Systematic

sampling technique was used because it ensures generalizability of findings and minimizes bias [6].

Qualitative Sampling Techniques and Procedures

After selecting the households, purposive sampling was used to select caretakers of children below 5 years of age to participate in the FGDs. A purposive

sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study. Purposive sampling is known as judgmental, selective or subjective sampling [12]. The purposive sampling technique was also used to select key informants who provided in-depth information on the topic under investigation by virtue of the offices that they occupied. The participants in the key informant interviews and FGDs were selected based on the saturation of the data obtained, the researcher interviewed participants to the KIs and FGDs and stopped when the data got saturated. Saturation is the point at which “additional data do not lead to any new emergent themes” [7]. When the additional data could not lead to any emergent themes, the researcher stopped. For the KIs data got saturated at 24 people and for the KIs data got saturated at 16 sets of FGDs comprising 32 study respondents.

Inclusion and exclusion criteria

At household level, the study team focussed on households with children under the age of five years. Households without children under five years of age were excluded from the study.

Variables and Indicators

The study assessed the outcomes of community-based nutrition education in addressing child malnutrition in the Karamoja Sub Region of Uganda. In this study, it is assumed that effective community-based child nutrition education programs improve nutrition outcomes among the children under five years of age.

Data Collection tools and Instruments **Semi structured Survey Questionnaire Method**

[6] defines a questionnaire as a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. The study used the semi-structured questionnaire survey method to collect data from the household respondents in the community. The semi-structured survey questionnaire was used because it is cost effective and allows for the collection of data from a big sample as suggested by [1]. The semi-structured survey questionnaire for the households was largely composed of two subsections. The first subsection focused on the demographic characteristics of the household, the caretaker, and the child.

The second subsection focused on assessing the community-based nutrition intervention, the modalities of delivering the interventions and the outcomes of the interventions.

Key Informant Interview Method

[3] defines interview as a data collection method that involves presentation of oral verbal stimuli and reply in terms of oral verbal responses. Oral personal interviews generally involve a face-to-face contact or conversation using structured questions as they are aided by the use of an interview guide. The study employed the interview method to collect data from the key informants who included development partners and government officials who implemented the nutrition interventions. Interviews in this study were used to obtain more in-depth information on the topic under investigation which would not be obtained with the use of closed ended questionnaires as observed by [3]. An interview guide was developed to collect data from the key informants. The interview guide mainly focused on the various community-based child education nutrition interventions and the different approaches used to implement the programs by the different stakeholders.

Focus Group Discussion Method

The study used Focus Group Discussions (FGDs) to collect more in-depth qualitative data from the household members. FGDs are a qualitative way of collecting data from respondents [3]. It involves getting a representative sample of respondents for a guided discussion about the topic under investigation [8]. An FGD guide was developed to collect data on the existing interventions, the modalities for implementing the interventions and the outcomes of the interventions on improving child nutrition status.

Document Review Method

The researcher reviewed documents to obtain recorded information that is related to the issue under investigation as suggested by [11]. This method was used to obtain first-hand recorded information from the implementing partners. A document review checklist was developed to aid with the collection of secondary data. The researcher reviewed program documents on nutrition education as well as activity and evaluation reports on nutrition education interventions.

Data Quality and Error Control Validity

Validity refers to the extent to which a measurement procedure measures what it is intended to measure rather than measuring something else, or nothing at all [6]. Content validity was used. Content validity is concerned with the extent to which an instrument covers an appropriate sample of items for the construct being measured and adequately covers the construct domain [12]. The questionnaire was examined by three subject matter experts working in academia, and those directly implementing child nutrition programs. The experts were asked to rate the items on a 4-point scale of relevance in relation to the outcomes of the community-based child nutrition education programs. Where 1= not relevant, 2= somewhat relevant, 3= quite relevant and 4= highly relevant. Then, for each item, the item content validity index (I-CVI) was computed as the proportion of experts in agreement about relevance by giving a rating of 3 or 4. Then, the scale level content validity (S-CVI) was computed by averaging the I-CVIs. A value of .70 was recommended as the standard for establishing excellent content validity [8]. The CVI for the questionnaire was 0.8 and this was acceptable because it was higher than the .70 threshold that was suggested by [10]. A discussion with some of the evaluators was done to understand the reason for the ratings and how to improve. Issues of face validity, clarity, specificity of variables were also investigated.

Reliability

Reliability refers to the consistency of the measuring instrument. According to [1], for an instrument to be reliable, it must yield the same measure when used on more than one occasion. Internal consistency reliability was assessed by obtaining coefficient alpha (Cronbach's alpha). It was used as the index to estimate the extent to which different subparts of the instrument are reliable in assessing the effectiveness of the community-based child nutrition intervention as suggested by [3]. In general values, below .60 are considered poor, .60 to .69 are minimally acceptable, .70 to .79 are moderate or acceptable, .80 to .89 are considered good, above .90 are excellent. The questionnaire was piloted using 5% of households by the research team to find out unclear or ambiguous

questions. Ambiguous questions were reworked on or removed. The pilot testing of the questionnaire was used to help estimate the time that was taken to respond to the questionnaire. The respondents from the household involved in the pilot testing were included in the main study. The overall Cronbach's alpha coefficient for the tools was 0.80 which is good according to [1].

Qualitative Data Quality Control

To ensure the quality of qualitative data, the researcher used the trustworthiness criteria. The aim of trustworthiness in a qualitative inquiry is to support the argument that the inquiry's findings are "worth paying attention to" [3]. [5] proposed four alternatives for assessing the trustworthiness of qualitative research, that is, credibility, dependability, conformability, and transferability. From the perspective of establishing credibility, researchers must ensure that those participating in research are identified and described accurately. Dependability refers to the stability of data over time and under different conditions. Conformability refers to the objectivity, that is, the potential for congruence between two or more independent people about the data's accuracy, relevance, or meaning. Transferability refers to the potential for extrapolation. It relies on the reasoning that findings can be generalized or transferred to other settings or groups [10]. The researcher mainly relied on the credibility test where interviews were conducted to determine whether the interview questions were suitable for obtaining rich data that answer the proposed research questions. Interview notes and transcribed text were examined carefully to critically assess the researcher's own actions for instance, questions were asked such as "Did I manipulate or lead the participant?" and "Did I ask too broad or structured questions?" Such evaluation did not only begin at the start of the study but was also supported by continuous reflection to ensure the trustworthiness of the qualitative data as advised by [2].

Data Collection Procedure

Data were collected using community surveys and key informant interviews with the implementing partners operating in the Karamoja Sub Region. Using systematic sampling, every fifth household in a village was selected to participate in the study. The surveys were

conducted in 373 households in Kaiku Parish and each of them lasted about 30 minutes. The survey data were collected using *Survey CTO Collect* an application that is used to collect large scale community data [9]. In each of the households, a child caretaker was selected to participate in the study. Data were collected from them by use of Research Assistants because of low literacy levels in the district as reported by [11]. After interviewing the caretakers, the research team with the help of community health workers assessed the children's nutritional status using measures like Severe Acute Malnutrition (SAM), Moderate Acute Malnutrition (MAM) and Medium Upper Arm Circumference (MUAC). The Key informants were also selected to participate in the study. Data from the key informants were collected using interviews. Data were collected from a total of 29 KIs and each interview lasted for about 45 minutes. Data were recorded using a recorder, they were later transcribed and used to write the report. FGDs were used to collect detailed and more in-depth information from the household members at community level. Two sets of FGDs were conducted in each of the villages in Kaiku Parish. In every village FGDs were conducted for men and women.

Ethical considerations

The researcher obtained Institutional Review Board Approval from the Nexus International University in order to ensure adherence to ethical research guidelines. The IRB approval letter was presented to the authorities, households and participating development partners in Nakapiripirit district. Before the data collection, consent was obtained from the District Administration, namely the Chief Administrative Officer and the District Health Officer to provide access to study participants. A formally written letter that explains the objectives of the study, time of commitment, potential impact, and potential outcomes of the research was sent to Nakapiripirit District Local Government to obtain permission to carry out this research. As [1] asserts, "all social research involves consent, access, and associated ethical issues since it was based on data from people about people." Interviews of participants will meet the general protocols and procedures for interviewing. The study obtained informed consent from the study participants. They were presented with

full information about the research, including the reasons why they were chosen to participate.

Participants' privacy, confidentiality, and anonymity were guaranteed. Consent forms and cover letters were provided to the study respondents. To ensure confidentiality and anonymity, the Research Assistants were asked not to write the names of the study respondents on the questionnaire even at data entry, the names of the study respondents were not entered into the computer program for analyses, so it was not easy to know who said what. The Research Assistants were deployed in such a way that they do not collect data from their own communities. They were deployed in other communities. The research team also took precautionary measures to ensure that there was no harm to the respondents. Like earlier mentioned, the researcher ensured confidentiality and anonymity of the study respondents to avoid victimization of the study participants.

Strategy for Data Processing and Analysis

Data Management

Before data entry and analysis was done, the researcher processed, and consolidated data collected from the survey questionnaire and interviews to ensure completeness and consistency. Data was cleaned, stored, entered using SPSS version 16. Open ended data were coded and double checked to ensure consistency. For qualitative data, field notes were written, and work edited at the end of each working day to ensure accuracy in recording the information given by the respondents consistently. The data obtained from both the field notes and the recorders were transcribed for analysis.

Quantitative Data Analysis

Computer based analysis was used to analyse the findings of this study. This method was preferred since a large amount of data were gathered from all the 373 respondents and it is cumbersome to analyse such data manually. Before data entry and analysis was done, the researcher processed, and consolidated data collected from the survey questionnaire and interviews to ensure completeness and consistency. The researcher then used SPSS version 16 for analysis where descriptive statistics and multiple response procedures were

applied to generate frequency tables. The analysis relied on both descriptive and inferential statistics. The descriptive statistics involved use of frequency counts, percentages as well as the mean and standard deviation. Descriptive data were presented in the form of tables. Inferential statistics involved using the Chi-Square. The Chi-Square test was used to determine the association between the community-based nutrition education interventions and child nutrition status in Namalu Sub County in Nakapiriprit district as suggested by [10]. The analyses involved use of cross tabulations and chi-square statistical tests to determine if there was any significant association between the community-based nutrition education interventions and child nutrition outcomes and to determine if

there was any significant difference between the households that participated and those that did not. Statistical significance was set at p -value < 0.05 .

Qualitative Data Analysis

Qualitative data were analysed using thematic analysis where themes were identified and put in coding categories to classify answers into meaningful categories so that the essential patterns of answers are brought out from the notes. A scheme of analysis was worked out following the coding categories using quotations and identifying literature which was used to discuss the findings. Qualitative data obtained from interviews were interwoven with results obtained from analysis of the household survey to explain the overall trends and phenomenon in the results.

RESULTS

Response Rates

This subsection focuses on the response rates of the study. Out of the 29 participants who were targeted to participate in the key informant interviews 21 participated representing a response rate of 72%. Out of the 372 household respondents who were targeted to participate in the study, a total of 362 participated in the study, representing a response rate of 97%. Overall, the response rate to this study was 97% which is acceptable according to [6] who puts the acceptable response rates at 30%.

Demographic Profile of the Respondents

Gender of Household Heads

Up to 42.3% of the sampled households in Namalu Sub County were female headed (**Table 3 below**). This was more pronounced in Nakuyon, Nakipenet II and Nakipenet III villages, but lowest in Nabore and Morua Loduk Villages. Vulnerability to food insecurity and child malnutrition has been linked to female-headed households.

Age Distribution of household heads

In the sampled population, 38.7% of the household heads were within the age bracket of 20 to 29 years. Higher vulnerability is associated with the very young heads of household in the age group 15 to 19 years and the very old in the age group of 60 years and above. The results in **Table 3** show that 21% of the household heads were aged between 15 and 19 years of age, while only 1.6% were above 60 years of age. These two groups are vulnerable to food insecurity and child malnutrition.

Education Levels of household heads

There is a positive association between

level of education and household income, which could in-turn influence the household food security and child nutrition. Overall, 50% of the household heads had never gone through any formal education, followed by 37% who had attained primary school education and only 13% who had attained secondary school education (**Table 3**). Lower education levels are likely to increase household food insecurity and impact negatively on child nutrition status.

Employment status of the household heads

Employment is strongly associated with household income and is therefore likely to affect food security and child nutrition [2]. It is worth noting that 16% of the household heads in the study area were unemployed (**Table 3**). Unemployment is likely to negatively impact family income, food security and child nutrition status.

Polygamy

The results in **Table 3** show that 37.8% of the household heads were in a polygamous relationship. Household polygamy was lowest in Nabore and Morua Loduk villages and was highest in Nakipenet V, Nakipenet II and Nakuyon villages. Vulnerability to food insecurity and child malnutrition were linked to polygamous households during both key informant interviews and FGDs.

The link between polygamy and vulnerability was confirmed during interviews with key informants where it was revealed that polygamous households were vulnerable to poor food security and child malnutrition as attested to by one

key informant who noted that: *“You find a man having so many wives and many young children, yet he cannot provide food for all of them. Such children end up falling sick or dying because of lack of food and malnutrition”* (Key Informant Interview, NGO). The findings suggest that polygamous households are prone to malnutrition because men cannot adequately provide for the big number of children in the households.

Household Family Size

The number of people who eat from the same household has a bearing on child nutrition and food security as illustrated in **Table 3**, household size ranged between two and five people for 60.8% of the households. It is worth noting that (39.3%) of the households reported having more than six people in the household. This is likely to have an impact on the food security and child nutrition in the household.

Disability and Chronic Illness

Disability and chronic illness are associated with reduced ability to work, which in turn influences the food security and child nutrition status level in the household. As illustrated in **Table 3**, 4.1% of the households were headed by persons with disabilities while 9.4% were headed by persons with chronic illnesses. Disability and chronic illness are likely to reduce the ability to work and impact negatively on food security and child nutrition status.

Number of under-five year old children in the households

Out of the sampled household heads, 50% had one child under five years of age, 25% had 3 children, 13% had 2 children and 12% had 4 children. As illustrated in **Table 3**, a big majority (88%) of the households had more than 2 children under the age of 5 years. Having many children below the age of five is likely to negatively impact the quality of childcare, health and

nutrition status.

Child nutrition status in the households

In order to obtain overall under-five nutritional status, the researcher collected data on child nutrition status indicators namely stunting, wasting, and MUAC. The results were combined to form the child nutrition status parameter. As clearly seen in **Table 3**, 35.6% of the children from the participating households were malnourished. This means that child malnutrition in Kaiku Parish stands at 35.6%. This is slightly higher than the regional average of 35%.

Mothers' Characteristics

Age Distribution

Most (70.4%) of the mothers who participated in the study were in the age category of 20 to 49 years. Those between 15 and 19 years were 29.6%. Findings from the key informant interviews revealed that teenage mothers and their children were nutritionally at higher risk because they did not have adequate knowledge to take care of their children.

Education Levels

Mother's level of education has a bearing and the child's nutrition status. The results in **Table 3** show that 55% of the mothers in Namalu Sub County in Nakapiriprit district did not have any formal education. Vulnerability to poor nutrition increases with low levels of mothers' education.

Employment status

Mothers' employment status has been linked with child nutrition. The findings in **Table 3** show that most (57.5%) of the mothers were peasant farmers, followed by 29.6% unemployed and then by only 13% who were doing business. High vulnerability to food insecurity and child malnutrition was linked with unemployed mothers during interviews. The key informants noted that the high levels of illiteracy and ignorance contributed to child malnutrition in the study area.

Table 3: Demographic Characteristics of the Study Respondents

Characteristics	Category	Frequency	Percentage
Gender of Household Heads	Male	209	57.7%
	Female	153	42.3%
Age Distribution of Household Heads	15-19	76	21.0%
	20-29	140	38.7%
	30-39	90	24.9%
	40-49	48	13.3%
	50-59	3	.8%
	60-69	3	.8%
	70-79	2	.6%
Employment	Pastoralist	178	49.2%
	Farmer	91	25.1%
	Business	36	9.9%
	Unemployed	57	15.7%
Polygamy Status	Polygamous	137	37.8%
	Non-Polygamous	225	62.2%
Household Size	2-5 People	220	60.8%
	6-10 People	136	37.6%
	Above 10 People	6	1.7%
Disability	Yes	15	4.1%
	No	347	95.9%
Chronic Illness	Yes	34	9.4%
	No	328	90.6%
Child Nutritional Status	Poor nutritional status	129	35.6%
	Good nutritional status	233	64.4%
Mothers' Characteristics			
Age Category	15-19	107	29.6%
	20-29	193	53.3%
	30-39	54	14.9%
	40-49	8	2.2%
	Education	None	199
Employment status	Primary	105	29.0%
	Secondary	58	16.0%
	Farmer	208	57.5%
	Business	47	13.0%
	Unemployed	107	29.6%

Outcomes of the Community-based Nutrition Interventions on Child Nutrition

According to the results in **Table 4**, 67% of the study respondents mentioned that their children's nutritional status had improved as a result of the community-based nutrition education interventions, while 33% disagreed. This seems to suggest that for most (67%) of the households in Namalu Sub County, child nutrition status improved as a result of

the community-based nutrition education interventions.

Association between accesses to community-based nutrition education interventions and under 5 child nutrition status

In order to determine the association between community-based nutrition education and under 5 child nutrition status, data were disaggregated by child nutrition status and a Chi square test was run. As summarized in **Table 4**, children

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from households that accessed community-based nutrition education had better nutrition status than their counterparts who did not (86.3% vs. 54.3%), and the difference was statistically significant ($X=45.2$, $P<0.05$). This suggests that access to community-based nutrition interventions positively impacts on under 5 child nutritional status.

Perceived Improvement in Child Nutritional Status as a Result of the Interventions

The study respondents noted that as a result of the intervention they were able to feed their children well and as a result, the study respondents reported that their children gained more weight (30.8%), they gained height (23.1%), gained increase in limb length (15.4%), fell sick less often

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(23.1%) and there was a general increase in the mid upper arm circumference.

Why Child Nutritional Status did not improve despite the interventions

When asked why child nutrition did not improve despite the intervention, the study respondents mentioned both intervention and household specific factors. The intervention specific factors included inadequate knowledge imparted by the interventions (16.8%) and failure by the facilitators to follow up on the beneficiaries (18.2%) (See **Table 4**). The household specific factors included lack of food to feed the children (32.5%), lack of money to buy food (15.7%) and children often falling sick hence impacting negatively on child nutrition status (16.8%).

Table 4: Outcomes of the community-based nutrition education interventions in addressing under-five child malnutrition in Namalu Sub County

Characteristics	Category	Frequency	Percentage		
Access to community based nutrition education	Beneficial	182	67.2		
	Not beneficial	89	32.8		
	Characteristics	Poor Nutrition Status	Good Nutrition Status	Chi Square	p value
	Yes	70 (54.3%)	201(86.3%)	45.2	0.00
No	59(45.7%)	32(13.7%)			
Perceived Outcomes of the interventions on the Child's Nutrition Status	Category	Frequency	Percentage		
	Weight gain	182	30.8%		
	Height gain	136	23.1%		
	Increase in limb length	91	15.4%		
	Reduced morbidity	136	23.1%		
	Increased mid upper arm circumference	45	7.6%		
	Total	590(Multiple Responses)	100.0%		
	Category	Frequency	Percentage		
	No food to feed the children	89	32.5%		
	No money to buy food	43	15.7%		
The knowledge imparted by the intervention was not adequate	46	16.8%			
The child constantly falls sick	46	16.8%			
No follow up by the facilitators	50	18.2%			
Total	274(Multiple Responses)	100.0%			

Knowledge Received

When asked what knowledge they got from the intervention, the household respondents mentioned getting knowledge on introduction of complementary foods (21.6%), having food/grain stores (17.5%), giving children energy rich foods (17.2%), breast feeding

practices (13.5%), giving children a balanced diet (12.9%), taking children for immunization so that they get Vitamin A and Iron supplements (8.7%), giving children protein rich foods (4.3%) and giving children clean food (See Table 5).

Qualitative Findings

In order to find out if these mothers were knowledgeable about malnutrition, they were asked during FGDs and to them malnutrition was referred to as *Chongulio*, which meant 'very thin', *Kikaran* meant 'very light body', while *Loorodo* meant 'no flesh on the body' in the local dialects. In general, there were differences in the individual perceptions of malnutrition during the various focus group discussions and key informant interviews. Most of the participants perceived under-nutrition in relation to eating poorly or only one type of food, being thin and sickly as well as irresponsibility of parents such as those who abused alcohol.

However, mothers of well-nourished children in Nakipenet I and V villages had a better insight/ knowledge about under-nutrition. They stated that under nutrition was when the child lacked a balanced diet, was thin, had retarded growth and distended stomach. This level of knowledge may be attributed to the nutrition education they had accessed in the community.

The team wanted to find out whether the community knew the causes of under nutrition. According to the participants in the FGDs, lack of food was the main cause of under nutrition. However, it could also be caused by prolonged periods of serving food to the child and laziness of the child's mother especially when they took long to feed. Other participants in the FGDs stated the lack of good feeding, lack of available foods, lack of good nutritive foods or eating only one type of food. Also stated among the causes was poor hygiene and sanitation as well as poor food preparation methods. Poor health and care-seeking practices also emerged among the causes of malnutrition during the FGDs. In general, almost all participants in the 8 selected villages considered death as the main consequence of malnutrition, a fact that was also confirmed by the key informants interviewed. Participants from Nabore Village also stated anaemia and stress, as well as reduced cognitive ability as consequences of malnutrition while those from Nakipenet III mentioned skin rashes and retarded growth. Among the other consequences stated were change in hair color, stress diarrhoea and reduced immunity, which could be reflected in the following statement by a key informant:

"Continuous illness of a child is a consequence of under nutrition" (Key informant interview). Among consequences to the family identified by participants were stress to family members, domestic violence and accusation of women as being responsible for the symptoms of malnutrition and abdicating of responsibilities by the men. The participants also highlighted the possibility of the family being stigmatized by the local community because of having a malnourished child as well as feeling degraded. The FGD participants and key informants also mentioned the increased household expenditure for treating the malnourished children. This could translate into decline in household saving and the sale of household assets such as animals.

Association between knowledge obtained and child nutrition status

According to the results in **Table 5**, the children of caretakers who were knowledgeable about child nutrition as a result of the intervention were well nourished compared to their counterparts whose caretakers were not knowledgeable (97.9% vs. 2.1%) and the difference was statistically significant ($X=33.2$, $p<0.05$). This suggests that the knowledge obtained from the community-based education interventions enhanced child nutrition status in Namalu Sub County.

Outcomes on Child Nutrition Practices Application of the Knowledge

The household respondents were asked whether they applied the knowledge obtained from the community-based nutrition education interventions. Out of the 271 respondents, 74% indicated that they applied the knowledge while only 26% indicated otherwise (See **Table 5**). This suggests that 74% of the household caretakers in Namalu Sub County who benefitted from the community-based nutrition interventions applied knowledge obtained from the training.

How the Knowledge was applied

When asked how they applied the knowledge, the results in **Table 5** show that the household caretakers introduced complementary foods (23.9%), applying good breast feeding practices (15.3%), giving children protein rich foods (14.5%), setting up food/grain stores in the home (14.4%), giving children a balanced diet (14.1%), taking children for

immunization in order to get Vitamin A and Iron supplements (9.7%), giving children energy rich foods (4.8%) and giving children clean food (3.4%).

Association between nutritional practices and child nutrition status

According to the results in **Table 5**, the children of caretakers who applied knowledge of the good nutrition practices obtained as a result of the

intervention were well nourished compared to their counterparts whose caretakers did not (95.7% vs. 4.3%), and the difference was statistically significant ($X=30.0$, $p<0.05$). The above findings suggest that the applying knowledge obtained from the community-based education interventions enhances child nutrition status in Namalu Sub County.

Table 7: Outcomes of the Intervention on Child Nutrition Knowledge

Characteristics	Category	Frequency	Percentage
Whether the beneficiaries received any knowledge	Yes	225	83.0
	No	46	17.0
Knowledge Received	Knowledge on introducing complementary foods	225	21.6%
	Knowledge on giving children energy rich foods	179	17.2%
	Knowledge on giving children protein rich foods	45	4.3%
	Knowledge on having a food/grain store in the home	182	17.5%
	Knowledge on giving children clean food	45	4.3%
	Knowledge on Taking children for immunization	90	8.7%
	Knowledge on giving children a balanced diet	134	12.9%
	Knowledge on breast feeding practices	140	13.5%

		Total	1040 (Multiple Responses)	100.0%			
Knowledge on child nutrition	Characteristics		Poor Nutrition Status	Good Nutrition Status	Chi Square	p value	
	Knowledgeable		2(1.6%)	228(97.9%)			33.2
	Not Knowledgeable		127(98.4%)	5(2.1%)			
How the knowledge was applied	Category		Frequency	Percentage			
	Introducing complementary foods		225	23.9%			
	Giving children energy rich foods		45	4.8%			
	Giving children protein rich foods		137	14.5%			
	Having a food/grain store in the home		136	14.4%			
	Giving children clean food		32	3.4%			
	Taking children for immunization		91	9.7%			
	Giving children a balanced diet		133	14.1%			
	Applying good breast-feeding practices		144	15.3%			
	Total			943 (Multiple Responses)	100.0%		
	Application of knowledge	Characteristics		Poor Nutrition Status	Good Nutrition Status	Chi Square	p value
		Applied		5(3.9%)	223(95.7%)		

Did not apply	124(10.4%)	10(4.3%)
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DISCUSSION

Outcomes of the community-based nutrition education interventions in addressing under-five child malnutrition

The study set out to examine the outcomes of the community-based nutrition education interventions in addressing under-five child malnutrition in Namalu Sub County in Nakapiripirit district. The study found that community-based education nutrition improved the nutritional knowledge and practices of the caretakers as well as nutrition status of children under five years of age in the study area. This therefore suggests that the nutritional knowledge, practices, and nutritional status of children under five years improved with sustainable nutritional education interventions.

The findings of this study are in line with earlier findings of scholars like [12], [4] also found a link between nutrition education and an improvement in child nutrition status. The study found that mothers and caretakers were knowledgeable about child nutrition as a result of the training, and they applied the knowledge. This was corroborated with the findings from FGDs and key

informant interviews where the mothers were able to define malnutrition and to identify the key practices for enhancing child nutrition.

The results of the study showed that the community-based nutrition education interventions enhanced knowledge, practices and child nutrition in Namalu Sub County. This is because the mothers were able to give their children complementary food, give them a balanced diet, give them protein and iron rich foods, give them clean food and take them for immunization to get vitamin A and Iron supplements. As a result of this, the mothers reported an improvement in their children's nutrition status in terms of increased height, weight, MUAC and reduced morbidity. The findings of this study are in line with earlier findings of scholars like [6] who found a link between nutrition education and an improvement in child nutrition status. However, unlike the above mentioned studies, which focused on health facility and school-based education contexts, this study focused on community-based contexts and found that it reduced child malnutrition at community level.

CONCLUSION

The study was set out to examine the outcomes of the community-based nutrition education interventions in addressing under-five child malnutrition in Namalu Sub County in Nakapiripirit district. The study found that community-based education nutrition improved the nutritional knowledge and practices of the caretakers as well as the nutrition status of children under five years of age in the study area. This therefore suggests that the nutritional

knowledge, practices, and nutritional status of children under five years improved with nutritional education interventions. Thus, it can be inferred that the community-based nutrition education interventions implemented in the Karamoja Sub Region by the different stakeholders and partners improved the nutritional status and reduced malnutrition among children under five years of age in the Karamoja Sub Region.

RECOMMENDATION

The Ministry of Health should strengthen Social and Behaviour Change Communication (SBCC) using Information Education and communication materials in the local languages to dispel myths and misconceptions on nutrition taboos for good nutrition. Enhance Community dialogues and awareness creation campaigns on the importance of good nutrition especially for children, pregnant and lactating mothers.

Strengthen early childhood development by improving the capacity of caregivers and infrastructure at the community centres, as well as creating greater awareness at community level about the benefits of nurturing care for children during the first five years of life. The stakeholders should help local communities form civil society organisations like community-based organisations and local Non-Government

Organisations to implement local community-based nutrition programs. The stakeholders should use the local language in the IEC material. They should

also use more pictures in the IEC material to ensure that the illiterate members of the community are able to understand.

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