

PEER SUPPORT GROUPS IMPROVE INFANT GROWTH AND
COMPLEMENTARY FEEDING PRACTICES AMONG
REFUGEES IN POST-EMERGENCY SETTLEMENTS
IN THE WEST- NILE REGION IN UGANDA

By

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
July, 2022

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ACKNOWLEDGEMENTS

I thank the almighty God for the great blessings made available to me throughout this journey. God, you have been faithful!

I am sincerely thankful to my Advisor, Dr. Barbara J. Stoecker for all the guidance, patience, kindness, and knowledge throughout this process. I am also very grateful to my committee chair, Dr. Deana Hildebrand for the unwavering support and advice right from when I started graduate school. I am also very grateful to my committee members, Dr. Sam R. Emerson, and Dr. Ki L. Cole for their support, guidance, and continued encouragement.

I am grateful to the Nestlé Foundation for funding my dissertation project and for all the flexibility to ensure that I accessed all the support I required to conduct my study.

I also thank Makerere University Kampala School of Food Technology, Nutrition & Bio-Engineering for the support of this research, especially Dr. Margaret Kabahenda for the guidance and supervision while I conducted my year-long study in Uganda.

I am sincerely grateful to my dearest wife, Joyce for the love, encouragement, and care. I am always indebted. I also thank my children, Jothan, and Josie for being a great support system every day. I am thankful to my entire family back in Uganda for the unconditional love and encouragement.

I am grateful to all faculty and staff of the Nutritional Sciences Department who are always very welcoming and supportive of students

I appreciate all my fellow graduate students, especially the team in Dr. Stoecker's lab for being very supportive and the kind encouragement. My experience would not have been the same without you!

May you all be blessed.

Name: JOEL J. KOMAKECH

Date of Degree: JULY, 2022

Title of Study: PEER SUPPORT GROUPS IMPROVE INFANT GROWTH AND
COMPLEMENTARY FEEDING PRACTICES AMONG REFUGEES IN
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IN UGANDA

Major Field: NUTRITIONAL SCIENCES

Abstract: Inadequate feeding practices and child undernutrition remain a primary health concern of refugees in post-emergencies. This study examined the effectiveness of a peer-led integrated nutrition education intervention using the Care Groups on infant nutrition and growth among refugees in Uganda. Seven focus groups among mothers, fathers and VHTs (n=56) and key informant interviews (n=9) were conducted. A year-long RCT of 390 pregnant women (3rd trimester) was conducted. Mother-infant dyads were measured for anthropometrics and complementary feeding practices. Barriers to maternal social support included lack of resources, cultural norms, and spousal consensus on roles. Facilitators were community and culture, physical and tangible support, social support structures, support sources, and extended postpartum rest. Perceptions were social interactions, financial support, advice and counseling, and mothers feeling some level of support. There was a positive effect on the introduction of solid, semi-solid, or soft foods (ISSSF) in the Moms-only arm at both Midline-II (AOR=4.0) and Endline (AOR = 3.8). Likewise, ISSSF was better for the Moms & Dads arm at both Midline-II (AOR= 4.5) and Endline (AOR=3.4) periods. Minimum dietary diversity(MDD) was significantly better at the endline only for the Moms & Dads' arm (AOR=3.0). Minimum acceptable diet (MAD) was significantly better at Endline only for both Moms-only (AOR=2.3) and Moms & Dads' arms (AOR=2.7). Infant consumption of eggs and flesh foods (EFF) was improved only in the Moms & Dads arm at both Midline-II (AOR=3.3) and Endline (AOR=2.4) periods. Higher maternal social support was associated with better infant MDD (AOR=3.3), MAD (AOR=3.6), and EFF (AOR=4.7). There were significant interaction effects of the Care Group intervention and maternal social support by time on infant mean LAZ ($F_{(6, 560)} = 28.91, p < 0.001$), WAZ ($F_{(5.8, 539.4)} = 12.70, p < 0.001$) and WLZ ($F_{(5.3, 492.5)} = 3.38, p = 0.004$). By Endline, the intervention improved infant mean LAZ (Moms-only vs Control (mean difference, *MD*) = 2.05, $p < 0.001$; Moms & Dads vs Control, *MD* = 2.00, $p < 0.001$) and WAZ (Moms-only vs Control, *MD*=1.27, $p < 0.001$; Moms & Dads vs control, *MD*=1.28, $p < 0.001$).

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CHAPTER I

INTRODUCTION

Background

Globally, undernutrition is the leading cause of disease among children in low- and middle-income countries (LMICs) [1-3]. Almost half of all child morbidity and mortality is due to undernutrition; similar to other leading causes of under 5 child mortality such as malaria, diarrhea, pneumonia, and birth complications [4]. In LMICs, malnutrition is worsened by the displacement of people during emergencies due to the disruption of already fragile food systems at the grassroots level [5]. Displacement of people may be a result of different natural and manmade causes; however, wars and civil conflicts have contributed the most to the refugee crisis [6, 7]. The United Nations High Commissioner for Refugees (UNHCR) [8] reported that the world's highest number of people forced to flee from their homes (82.4 million) was recorded in 2021. Six African countries with a total of 6.1 million refugees contributed to the continent's ranking as the second-largest refugee population after Asia. Over one-third, (36%) of the refugees in Africa were from South Sudan.

The UNHCR ranked Uganda third jointly with Pakistan among all countries in the world hosting displaced persons [8]. The majority of refugees, mostly women, and children, in Uganda were from South Sudan. Most of the refugees are hosted within refugee settlements located in rural areas of the country [9, 10]. These refugees fled from their country of origin due to the onset and escalation of civil wars resulting from internal power struggles [11, 12]. As people flee to find safe refuge, there is an increased risk of disease, poor social services, limited healthcare, food insecurity, undernutrition, and mortality. Previous studies in Côte d'Ivoire [13, 14] that examined health during conflict reported a decrease in the quality of children's meals and reduced linear growth as part of the negative impact of conflict on child health and nutrition outcomes. Additionally, the social support systems of refugees during the emergency period are disrupted because of their displacement [15]. After the two-year emergency period [16], refugees in Uganda may stay within post-emergency settlements for an average of 26 years [15, 17].

Amidst reduced emergency aid to refugees in post-emergency settlements [15, 18, 19], inadequate infant feeding practices and child malnutrition remain a high concern. For example, the Uganda Food Security and Nutrition Assessment 2017 report (FSNA) [20] showed that the introduction of solid, semisolid or soft foods (ISSSF) to infants (6 – 8 months) in the post-emergency settlements in the West Nile region of Uganda was 53.5 percent. By 2020, there was an additional 12.9 percent increase in ISSSF among infants, yet, only about one-quarter of the infants in these settlements met recommendations for minimum dietary diversity (24.2%) and consumption of iron-rich foods (27.8%) [21]. Optimal child feeding practices are critical in addressing infant malnutrition [22-25]. An increase in malnutrition lowers the body's resistance to infection and diseases [26, 27].

Refugees, especially the most vulnerable such as children and women, are more susceptible to increased morbidity and mortality because of reduced immunity. However, health policies, the direct and indirect nutrition-focused programs targeting positive social behavior change communication at both individual and inter-personal levels may improve child feeding practices, and nutritional status [15, 23, 28]. A recent global survey [29] showed that engaging family members in nutrition-related activities improved feeding practices in both households and communities. Studies in Kenya [30-35] and Uganda [36, 37] reported positive associations between engagement in peer support groups and infant and young child feeding (IYCF) practices and improved child growth. Also, other studies in Malawi [38], Mozambique [39], and Zimbabwe [40, 41] reported that maternal peer support using the Care Group model was beneficial to child feeding practices and nutritional status.

Further, a study in Uttar Pradesh, India [42] reported that maternal social support was positively associated with improved complementary feeding practices. On the contrary, a Young Lives Study (YLS) of 1,833 children from India indicated that social support was not associated with child growth [43]. Also, a community-based survey in rural Nicaragua [44] surprisingly reported that low levels of maternal social support among women were associated with better infant nutrition and higher infant length-for-age z-scores (LAZ). These negative associations were attributed to a stronger influence of traditional views regarding child feeding and a resultant likelihood of exclusive breastfeeding.

These mixed findings among previous studies primarily informed our interest in examining maternal social support and its role in IYCF practices and child nutrition.

Additionally, research exploring the role of maternal peer support groups on IYCF and child growth among refugees is extremely limited [45]. Furthermore, this is the first study, to our knowledge, investigating the relations between maternal peer support using the Care Group model, child feeding practices, and growth in post-emergency settlements. Therefore, the purposes of the study were 1) to investigate maternal social support among refugees in the post-emergency settlements in the West-Nile region in Uganda, and 2) to examine the effectiveness of a peer-led integrated nutrition education intervention delivered through the Care Group model on complementary feeding of infants and their growth in post-emergency settlements in the West Nile region in Uganda.

Study objectives

The objectives of the study were:

- To identify the barriers, facilitators, and perceptions of maternal social support among refugees in Uganda.
- To determine the effects of a peer-led integrated nutrition education intervention on maternal social support among refugees in Uganda.
- To analyze the relationship of the intervention using the Care Group model on complementary feeding of infants (introduction of solid semi-solid and soft foods (ISSSF), minimum dietary diversity (MDD), minimum meal frequency (MMF), minimum acceptable diet (MAD), and eggs and or flesh foods consumption (EFF)) by refugees in Uganda.

- To examine the association between maternal social support and complementary feeding of infants among refugees in Uganda.
- To determine if the intervention using the Care Group model had a similar effect on complementary feeding of infants between the treatment arms (Moms-only and the Moms & Dads arms).
- To investigate the effects of a peer-led integrated nutrition education intervention using the Care Group model on growth, (length-for-age z-scores [LAZ], weight-for-age z-scores [WAZ], and weight-for-length z-scores [WLZ]), among infants of refugees in Uganda.
- To examine if the study intervention using the Care Group model had a similar effect on infant growth between the intervention arms (Moms-only and the Moms & Dads arms).

Significance of the study

A few studies have explored maternal social support among refugees in post-emergency settlements in LMICs. Also, only a few studies have examined how peer support groups are associated with infant and young child feeding practices (IYCF) and growth in some LMICs, especially in rural contexts. To our knowledge, this was the first study to investigate the effects of a peer-led integrated nutrition education intervention using the Care Group model on complementary feeding practices and growth among refugees in the post-emergency settlements in the West-Nile region in Uganda. Further, this study described the barriers, facilitators, and perceptions of maternal social support among refugees in these settlements. There are over 82.4 million displaced persons and

refugees worldwide [46] hosted in different environments. Our study may not be generalizable to refugees hosted in high-income / developed countries such as Australia, Europe, and America. However, the findings from this study will support improving nutrition-focused indirect programs and informing policies on infant and young child feeding practices of post-emergency refugees within LMICs

The use of the community randomized control trial for this study enabled us to discuss causality between maternal peer support, complementary feeding of infants, and infant growth among refugees. Also, the qualitative component of the study enabled us to understand key aspects of maternal social support among refugees and to modify the social support tool to suit the cultural values of the South Sudanese refugee community.

We anticipated having a modest loss to follow-up. Refugees in the post-emergency settlements tend to move toward South Sudan in search of livelihoods to take care of their households. This expectation was the basis for a 23 percent increment for loss due to follow-up. Further, the researchers requested a verbal commitment from the participants before signing the consent to participate in the year-long study.

Study limitations

Our study gathered perceived scores of maternal social support during the data collection process which might have been affected by social desirability bias based on participants' expectations from the study. However, the respondents were informed during the review of informed consent before starting the data collection that the study was exclusively academic. The respondents were informed that participation in the study

had no bearing in terms of routine benefits received by refugees from humanitarian agencies.

Also, the data on complementary feeding practices may have been affected by respondent recall bias. However, we comprehensively probed the respondents during the data collection to increase the accuracy of the information provided by the respondent. Further, we utilized a standardized questionnaire for feeding practices that we adopted from the Demographic and Health Surveys [47] and UNHCR standardized expanded nutrition surveys (SENS) guidelines [48]. These two questionnaires have been widely accepted for nutrition data collection for nationally representative samples and humanitarian populations.

The data collected over the four study periods were conducted door-to-door for the sampled households. This was challenging during the rainy season as all access roads and footpaths were muddy and very impassable due to being slippery. Some of the easy access roads and bridges to the settlements were completely carried away in the rainy season, forcing the research team to use longer routes to access the refugee settlements to conduct activities of the study. For example, conducting of follow up visits to supervise the Care Group meetings of the participants was a challenge during the rainy season due to the difficulty in crossing from one community cluster to another in a timely manner.

The study may have been affected by the COVID-19 pandemic safety operating procedures (SOPs). The onset of the pandemic, especially at the start of the year-long intervention, limited the number of participants meeting in the Care Groups. Restricting the Care Group numbers from the originally planned 10 – 20 members to a maximum of

5 – 10 members in line with the SOPs may have affected the interaction or process of peer support as envisaged in the planning of the study. Also, while COVID-19 SOPs were emphasized, the fear associated with the fatality of the pandemic at its onset globally may have limited the social interaction of the Care Groups, especially in activities such as home visits [49].

CHAPTER II

LITERATURE REVIEW

Refugee crisis

The UNHCR 2020 report showed that of the 82.4 million displaced people in the world, at least 26.4 million were refugees fleeing from conflict or persecution in their countries of origin. More than half of these displaced people were less than 18 years of age, potentially declared minors in many countries across the world [8]. Further, 86 percent of these refugees, mostly from neighboring countries, were hosted in LMICs in rural areas. Also, in 2020, UNHCR estimated that almost 340,000 infants were born as refugees in camps and post-emergency settings [50]. Children born in refugee settings further contribute to the proportion of vulnerable persons in the settlements. The UNHCR together with the host countries and supporting humanitarian agencies provide aid to the displaced persons including all social services and security from life threats enabling both survival and thriving of displaced people [16]. South Sudan is one of the countries in the world contributing to the majority (68%) of the refugee crisis [50]. UNHCR ranks South Sudan together with Yemen, Iraq, and Syria as the four highest (Level 3) humanitarian emergencies in the world [51].

South Sudanese refugees

The Republic of South Sudan is the most recent country formed after gaining independence in 2011, becoming Africa's 55th country [52]. South Sudan officially separated from Sudan on July 9, 2011, after a prolonged conflict between the two countries for sovereignty [53]. South Sudan is located in Eastern Africa, covering 644,329 sq. kilometers with an estimated population of 12.8 million people [54]. South Sudan is bordered to the north by Sudan, the west by the Central African Republic, to the South by Uganda, Kenya, and the Democratic Republic of Congo, and to the east by Ethiopia. The majority (51%) of the South Sudanese are under 18 years of age. Most of the South Sudanese (83%) live in rural settings with most of the population (80.9%) having attained primary education [55]. The country is largely agrarian with 78 percent of households dependent on growing crops and animal rearing as the main source of income [56]. However, the majority (51%) of the population are considered poor by the measure of a household being able to spend more than two dollars a day [57]. The South Sudanese are largely African, even though a small proportion are identified as Arabs. Most of the population are Christians. About two-fifths of the South Sudanese are of the Dinka ethnic group, followed by the Nuer who account for one-fifth of the population. The other ethnic groups including the Madi, Bari, Zande, Shilluk, and Anywa constitute smaller proportions [56].

Even though South Sudan got independence, conflicts that continued with Sudan over ownership of oil reserves destabilized the peace within the country. Also, civil strife ensued among the ethnic groups, mainly the Dinka and Nuer due to power struggles for the new State [12]. Post-independence, South Sudan had two major conflicts in

December 2013 and July 2016 that were responsible for the displacement of over two million people. These conflicts escalated an already dire humanitarian situation leading to an influx of refugees to the neighboring countries [58]. As of 2018, about 1,380,000 South Sudanese were being hosted in Uganda as refugees [9].

The majority of the refugees remain deeply connected to their homeland and hope for repatriation if peace is sustainably achieved [59]. A decline in the conflicts in 2019 allowed some refugees to return to South Sudan. The 2020 UNHCR situation report highlighted that Uganda only still hosted 867,453 South Sudanese refugees in the country, mostly in the West-Nile region with some refugees voluntarily having traveled back to South Sudan [60]. However, the continued civil conflicts among local communities back in South Sudan increase the fragility of the nation and the hesitance of other refugees who may have wanted to go back to South Sudan much sooner. Also, the unending conflict has continued to destabilize the South Sudan economy and imperil development gains thus increasing the widespread poverty and poor service delivery in the country [56]. South Sudan is among the countries with the lowest education and health indicators worldwide, largely attributed to the protracted conflict. For example, the UNICEF 2021 report showed that South Sudan was among the countries with the highest maternal mortality ratios in the world with more than 1,150 fatalities per 100,000 live births [61].

Child health in South Sudan

The vulnerability due to the humanitarian crisis among South Sudanese is existent for children in refugee settlements in neighboring countries and those that stay back in South Sudan [62]. The most recent South Sudan Household Health Survey report (SHHS-

II) [55] indicated that South Sudan had a high prevalence of child undernutrition. In that national survey, findings on the assessment of growth of children under five years of age showed that almost 28 percent of the children were stunted, 32.8 percent underweight and 12.2 percent wasted. All proportions of undernutrition reported were either in the high or very high category according to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) guidelines [63]. Further, in South Sudan, over 1.1 million children (< 5 years of age) were estimated to be acutely malnourished [62]. The proportion of undernourished children is expected to increase due to the effects of the Covid-19 pandemic [3]. Recent studies have highlighted the negative irreversible effects later in life as a result of undernutrition among infants and children during the first 1000 days window of opportunity [3, 64]. The first 1000 days is the period from when a fetus is formed during pregnancy to the second birthday of a child.

The SHHS-II also reported that nearly half (45.9 %) of children 12 – 23 months had not received any vaccinations since birth regardless of the universal standards of immunization of children against vaccine-preventable diseases. Further, 20.8 percent of the households were reported not to have consumed iodized salt [55] which increases the risk of iodine deficiency for all persons in a household with low iodized salt consumption and augments the possibility of congenital malformations in fetuses in utero.

South Sudan still has a humanitarian crisis due to protracted conflicts. More than half of the households (56.3%) were food insecure [56, 65], yet other natural disasters, such as flooding and drought, have hindered efforts toward improving food production and livelihoods worsening the humanitarian crisis [62]. However, in 2019, through peaceful negotiations and signing treaties among conflicting communities, the South

Sudanese government has prioritized addressing conflict as a key underlying factor for the stability of the nation [66, 67]. Further, working towards the revival of the fiscal national platforms will support addressing the economic crisis. As some of the South Sudanese refugees consider returning from countries that hosted them, there is a need to ensure that their health and well-being do not deteriorate compared to the health status in refugee settlements.

Refugees in Uganda

In 2020, one in every five refugees in the world was hosted in the Eastern Africa region [46]. Uganda is the leading host of refugees in the region and on the African continent with the majority of the refugees coming from Southern Sudan [68]. Uganda ratified the Geneva convention of July 28th, 1951, and the 1967 protocol of New York on the status of refugees and guidelines for host countries. Further, Uganda endorsed the 1969 Organization of African Unity (OAU) convention which guides specific aspects of refugee crises in Africa [17]. Also, consistent with its international commitments toward supporting refugees, the preservation of refugee rights and freedoms is embedded in Uganda's 2006 refugee act and the 2010 refugee regulations [69, 70]. Uganda, together with UNHCR, has continuously provided refuge to its neighboring nationals fleeing their countries due to armed conflicts. Examples include refugees from South Sudan fleeing the Sudan People's Liberation Movement (SPLM) war, from the Democratic Republic of Congo fleeing the Allied Democratic Forces (ADF) war and previously from Rwanda fleeing the 1994 genocide.

The Government of Uganda (GoU), through the Refugee and Host Population Empowerment (ReHoPE) strategy [17], provides an integrative system delivering equal

access to social services and socioeconomic opportunities for both the refugees and the host communities. Under the ReHoPE strategy, Uganda uses a settlement approach through which refugees are hosted in villages rather than camps. The refugees have the liberty of movement, access to education, and establishing and engagement in business and work [17, 71]. By combining development program resources with humanitarian assistance, the ReHoPE strategy allows both the refugees and host communities to acquire more structural support due to sharing of resources. Therefore, improved services access and economic opportunities within settlements and hosting communities enable the refugees to achieve some self-reliance due to limited dependence on aid over time [17, 71].

In summary, the recurrence of civil unrest in South Sudan implies that the refugee crisis is an ongoing concern. Because the conflict worsens food insecurity and malnutrition, there is an increased risk of child growth failure, childhood illness, and fatalities [72]. Providing evidence for health-and nutrition-centered strategies through both direct and indirect approaches targeting both immediate and underlying causes of morbidity and mortality, especially among vulnerable categories is important [23]. Some of the programs implemented in post-emergency settlements may also be implemented within rural communities in South Sudan as refugees are resettled after repatriation.

Nutrition among refugees

Displacement of people from their homes increases their vulnerability to acute food insecurity and undernutrition whether they remain internally displaced or seek refuge in other countries [73, 74]. For example, the conflict-induced humanitarian crisis in South Sudan led to food insecurity that remains among South Sudanese refugee

populations associated with increased malnutrition while children are the most affected [20]. The UNHCR together with the host country and humanitarian agencies assists the refugees [16, 75]. Some of the aid for refugees includes a food basket from the United Nations World Food Programme (WFP) that includes cereals, legumes, vegetable oil, sugar, salt, and group-selective nutritious blended foods to meet their calorie and micronutrient requirements [76].

However, reduced donor funding has led to a decrease in humanitarian aid provided to refugees and thus ration cuts of the food basket provided [19, 51]. Further, due to increased vulnerabilities, some refugees are forced to sell off part of their rations to meet other basic needs [77]. Also, some of the countries hosting these refugees, especially in LMICs, suffer from food insecurity due to natural causes such as drought, floods, locusts, and El Niño. The 2021 global report on food crises showed that Uganda was one of 52 food-crisis countries/territories hosting refugees [78].

Among other services, Uganda also strives to improve food security among refugees by providing them with land to establish their shelter and for agriculture under the ReHOPE strategy [17]. The refugees are supported and encouraged to grow crops to improve the availability, accessibility, and utilization of food at the household level. However, a combination of factors not limited to acute food insecurity, childhood morbidity, and inadequate infant and young child feeding knowledge affect both the quality of household food and complementary practices of feeding children.

Complementary feeding practices

The IYCF practices directly influence a child's growth and development, especially in the first 1000 days of life [79]. However, meeting the adequate practices of

complementary feeding remains a challenge among LMICs [61, 78]. Children in humanitarian settings are more likely to experience poor feeding practices thus increasing the risk of undernutrition, morbidity, and mortality [80, 81]. The UNICEF reported that in 2020, close to one-quarter (24%) of children (6 – 23 months) in Southern and Eastern Africa experienced poor quality nutrition assessed by failure to meet the minimum dietary diversity of five or more food groups of the recommended eight (UNICEF, 2021). Similarly, the WFP reported in 2020 that the proportion of households meeting child dietary quality recommendations among Ugandan refugee settlements was low (24.2%) [21].

The IYCF practices of children from birth to 23 months are widely defined and assessed based on the IYCF indicators that were jointly developed by the World Health Organization (WHO) and UNICEF. These IYCF indicators were revised from the previous WHO IYCF eight indicators [82] to the current 17 IYCF indicators [Appendix 1] [79]. These indicators are presented as percentages of the children who met the requirements of each indicator. In this study, five indicators were used to assess the complementary feeding practices of infants 6 – 11 months of age. These included the introduction of solid, semi-solid and soft foods (ISSSF), minimum dietary diversity (MDD), minimum meal frequency (MMF), minimum acceptable diet (MAD), eggs, and/or flesh food consumption (EFF). The feeding practices of children in a sample are presented as a proportion of children that met the guidelines for the specific indicators.

Introduction of solid, semi-solid, or soft foods 6 – 8 months (ISSSF)

The practice of introducing solid, semi-solid, or soft foods to an infant (complementary feeding) is recommended to start at six months of age because feeding

only with breast milk is no longer nutritionally sufficient [79, 83]. After 6 months, in addition to breastfeeding, a child requires complementary foods to meet the body's demands for optimal growth and development [23, 44, 64, 84]. A low nutrient intake would increase the risk of a child being malnourished.

The WHO and UNICEF emphasize the importance of the timeliness of introducing complementary foods to infants. Any infant 6 – 8 months of age who receives solid, semi-solid, or soft meals regardless of being breastfed or not is considered to have achieved timely ISSSF [79, 82]. Introducing complementary foods to infants before 6 months of age negatively affects the appeal of breastfeeding thus reducing the opportunity to acquire various nutrients and bioactive components. For example, growth factors, enzymes hormones, and live cells that support a child's growth and development are present in breast milk which a non-breastfed child would miss. Also, early ISSSF is associated with increased respiratory infections and diarrhea which would contribute to child morbidity, undernutrition, and mortality [85, 86]

Minimum dietary diversity (MDD)

The WHO recommends that any child between 6 – 23 months regardless of whether they are breastfed or not should improve their dietary quality by consuming a variety of foods from different food groups. Consuming a variety of foods increases the likelihood of meeting the nutrient requirements [87, 88]. MDD assesses the micronutrient adequacy of a child's diet. The eight food groups include 1) breast milk, 2) grains, roots, tubers, and plantains 3) pulses, nuts, and seeds 4) dairy products 5) flesh foods 6) eggs, 7) vitamin-A-rich fruits and vegetables, and 8) other fruits and vegetables. The MDD indicator is based on a cut-off of five out of eight food groups consumed by a child aged

6 – 23 months in the past 24 hours. For example, if a child (6 – 23 months) in the past 24 hours was breastfed, had infant formula, had an orange, also ate some kale, and had some scrambled eggs, then that child will be considered to have met MDD.

Minimum meal frequency (MMF)

Consuming meals less than the recommended number of times may negatively affect the energy and micronutrient intake which increases a child’s risk of poor growth and micronutrient deficiency [89]. The MMF indicator is a proxy that assesses the proportion of children aged 6 – 23 months who were fed solid and semi-solid or soft foods (including consumption of milk for non-breastfed children) for the recommended number of times in the previous day. The guidelines recommend that breastfed infants 6 – 8 months of age are fed complementary foods 2 – 3 times a day. For children who are breastfed and are 9 – 23 months of age, complementary foods should be provided 3 – 4 times a day, and some nutritional snacks are also given to the child 1 – 2 times a day. However, for children that are not breastfeeding, 4 – 5 meals should be provided per day [79].

Minimum acceptable diet (MAD)

The MAD indicator includes the number of times a child 6 – 23 months had meals in the previous day together with the variety of foods that they were able to consume. MAD further considers that non-breastfed children should at least have consumed milk twice the previous day. For children aged 6 – 23 months that were breastfed, MAD is achieved if the child met the minimum dietary diversity and also the minimum meal frequency in the past 24 hours. For children aged 6 – 23 months that were not breastfed, MAD is achieved if the child met the minimum dietary diversity and also the minimum

meal frequency in the past 24 hours but also consumed not less than two milk feeds in the same period.

Eggs or flesh foods consumption (EFF)

Consumption of eggs and flesh foods among children aged 6 – 23 months is limited in many countries especially LMICs [90]. However, the practice of consuming meat, fish, poultry, and eggs as often as possible is recommended for children aged 6 – 23 months because of the varied nutrient benefits and better linear growth. For example, feeding a child with eggs will improve their protein intake and also provide additional nutrients such as phosphorus, vitamin D, selenium, essential fatty acids, and vitamin B12. Also having a child consume meat would improve their protein and zinc intake. The nutrients a child acquires from consuming eggs and meats contribute to the growth and development of a child. This EFF indicator is derived from a child's consumption of flesh foods or eggs. These two food groups are also part of the eight food groups in the MDD indicator. Children are considered to have met EFF if either flesh foods or eggs (or both) have been consumed the previous day.

Child undernutrition

Child undernutrition has long been a public health challenge in the world [1]. In 2020 across the world, UNICEF reported that about 149.2 million children under 5 years were stunted and up to 45.4 million children were wasted. The children most affected by undernutrition are in Africa [91]. The UNICEF 2020 report showed that 61.2 million stunted children and 12.3 million wasted children were from Africa [3]. Even though there has been a decline in undernutrition for the past ten years, the current proportions of undernutrition among children remain unacceptably high. Undernourished children have

a higher risk of irreversible impairments [23, 44, 84, 92]. Undernutrition during early childhood limits child growth, development, and the potential to thrive later in life [3, 64, 93]. A meta-analysis on the interventions of maternal and child nutrition [94] reported that the nutritional status of individuals in emergency and non-emergency contexts overlapped with emergencies heightening existing poor growth. Child undernutrition is determined using WHO growth indicators to assess child stunting, wasting and underweight based on z-scores. The z-scores calculated after subtracting the measured length/height or weight of a child from the median value of the reference population and adjusted for sex and age. Child growth indicators include LAZ or HAZ, WAZ and WLZ or WHZ. A cutoff of -2 z-score indicates stunting for LAZ/HAZ, wasting for WLZ/WHZ and underweight for WAZ.

Over one million South Sudanese children under the age of 5 years were acutely malnourished (wasted), including more than 273,600 identified as severely acutely malnourished (SAM) [95]. In Uganda, the 2020 Food Security and Nutrition Assessment report (FSNA) showed that the proportion of stunted child refugees under five years of age was very high (27.4%) [21]. Refugees hosted in LMICs are a vulnerable sub-population who have challenges that may affect their food and nutrition security [96]. Poor child feeding practices increase the risk of undernutrition [25]. Further, the 2020 FSNA reported that child complementary feeding practices among refugees were poor [21].

In summary, child undernutrition is an ongoing challenge among children in humanitarian situations. However, interventions providing social behavioral change

communication (SBCC) can improve child feeding practices among households and the community [15].

Social support

Social support is a complex construct with many attributes [97]. Social support has various ways in which it may be conceptualized and measured [98], however, no consensus has been agreed upon. Comparisons of findings based on social support have been challenging because of various ways in which social support has been conceptualized and assessed in programs and research [99]. Social support and social networks are functions, structures, and processes of social relationships.

Social networks may be described as a web of social relationships that individuals have with peers and other persons that impact one's day-to-day choices [100]. Social networks are characterized by how well individuals know one another, how close they live to one another, the frequency of interaction, and the extent to which they help one another in times of need [101]. Social support is the support that individuals get from one another through their networks. Social support may be characterized in the form of emotional support, support required in accessing information to resolve problems, physical help to accomplish tasks, and support received through constructive feedback and self-evaluation [101, 102].

Among refugees, social networks are disrupted during the onset of a humanitarian crisis [15, 103]. However, new social networks are formed as these displaced people settle in the countries or communities hosting them [104, 105]. Displaced communities establish early social connections within their ethnic communities, as a disparate collection of vulnerable groups often have limited meaningful social connectedness

beyond these communities [15]. A study on refugees from Congo, Burundi, Somalia, and Sudan who resettled in Australia [106] reported that engaging in communal activities such as gardening increased social connectedness and the wellbeing of refugees.

In summary, interventions providing nutrition education through a peer support approach may provide an opportunity for group members to process their feelings with like-minded people through well-developed structured activities [101]. Furthermore, social support through peer-led interventions are effective in helping people manage their conditions for improved health [107, 108].

Social support and child feeding practices

Refugees suffer from poor nutrition due to vulnerability to food insecurity. Child refugees are more affected with a higher susceptibility to malnutrition due to higher nutrient needs for homeostasis and growth demands than adults [5]. Displaced people have a higher risk of vulnerabilities [15]. A prospective cohort study on refugees in Australia [109] reported that the high level of nutritional vulnerability among the refugees was associated with the inability to meet the minimum recommended nutritional requirements through food rations provided. Similarly, a study on South Sudanese refugees resettled in the United States reported an increased vulnerability to household food insecurity. In that study, the vulnerability was associated with increased social support, however, it was posited that social support did not improve poverty which led to food insecurity [96]. Nevertheless, social support through social networks, such as Care Groups, has been reported to directly influence food choices and eating patterns, therefore, affecting feeding practices [101].

Social support is also described in the ‘resource of care’ concept. The ‘resource of care’ concept explains that social support is one of the key fundamental constructs in building the knowledge of caregivers to enable action for maternal and child nutrition and health promotion [110]. Recent studies [111-113] reported that societal, household and individual factors enable the achievement of effective child feeding practices. These factors are part of the facets that enable an individual to provide or acquire social support within their community [100]. Also, the integration of these factors such as the personal, interpersonal, institutional, community/environmental, and policy influencing health behavior and practices are similarly described to influence behavior and practices such as child feeding practices in the social-ecological model (SEM) [114].

A cross-sectional study evaluating the effectiveness of a community-based participatory nutrition education and supplementation promotion program in Ethiopia [115] reported that higher maternal social support was associated with better child dietary diversity. Similarly, a community-based randomized control trial in Kenya [32] reported that engaging child caregivers in an integrated nutrition education intervention improved dietary diversity in the complementary feeding of children. In that Kenyan study, improved dietary diversity was attributed to improved nutrition knowledge acquired from the peer groups in which the intervention was implemented. Further, a study in southern Malawi examining beneficiaries enrolled in a supplementary feeding program [116] showed that the engagement of Care Group volunteers gave an effective flow of nutritional information among child caregivers which improved child feeding practices. Also, other studies reported that interventions targeting maternal social support were associated with better IYCF practices and were easily adaptable within the cultural

context of the areas of implementation of the studies [117-119]. However, caution may be required in considering nuances in cultural contexts among communities [120].

In summary, delivering a social support-based approach, for example, using the Care Group model, may provide a much-needed cost-effective, scalable, and sustainable strategy to improve poor IYCF practices. Such an SBCC nutrition-focused indirect program may in the long run prevent child malnutrition among refugee children in West Nile post-emergency settlements because of the improved feeding practices. While Uganda has Care Groups being implemented by independent non-governmental organizations targeting community development [121], the effects and sustainability of Care Groups remain untested in post-emergency settlements. Therefore, delivering a peer-led integrated nutrition education intervention using Care Groups provides an opportunity to improve IYCF practices in post-emergency settlements.

Social support and child nutritional status

Child stunting, wasting, and underweight remain significantly high among the post-emergency settlements in the West Nile region of Uganda [20]. The high number of refugees and limited resources to meet their nutrition demands within settlements worsen preexisting malnutrition conditions [122]. Strategies engaging communities in integrated nutrition interventions among peer groups may improve nutrition practices, consequently reducing malnutrition [123]. Studies involving Care Groups as a social support approach for mothers in LMICs [42, 124, 125] reported improved breastfeeding and complementary feeding practices, and reduced rates of undernutrition in children. Further, a cluster-randomized trial in Ethiopia evaluating the effectiveness of a community-based nutrition program on improving child growth reported that children of

mothers in the intervention had higher social support and were less likely to experience stunting and underweight compared to children whose mothers were not included in the intervention [126]. Also, recent meta-analyses [24, 127] reported that nutrition-sensitive interventions providing peer support for mothers showed significant association with improved child growth.

In the effort to determine sustainable strategies that may help in addressing the ongoing challenge of undernutrition in post-emergency settlements, using an integrated nutritional education intervention provided through Care Groups may improve child growth indicators (LAZ/HAZ, WLZ/WHZ and WAZ) in post-emergency settlements. The WHO recommends these child growth indicators for child nutritional status assessment [128]. The z-scores are determined by calculating the difference between the median measurement of the reference population and the child's anthropometric measurement adjusted for sex and age. A z-score of less than -2 indicates the presence of growth failure in a child. For example, children with LAZ/ HAZ less than -2 are considered stunted, those with WAZ less than -2 are considered underweight and children with WLZ/ WHZ less than -2 are considered to be wasted. For all growth indicators, a z-score of less than -3 is considered a severe growth failure in a child.

Summary

Conflicts are the leading cause of the humanitarian crises globally [46]. As people are displaced from their homes, there is increased vulnerability to food insecurity which increases the risk of undernutrition. Refugee children are at an even higher risk of undernutrition because of the poor quality of foods consumed. In humanitarian situations, sustainability of direct food aid for displaced people in post-emergencies is a challenge

due to donor fatigue, reduced funding for international humanitarian assistance [129], and the limited evidence of sustainability amidst competing humanitarian priorities globally [15]. Reduced funding for International Non-Government Organizations (INGOs) and humanitarian agencies affects refugee food systems through reduced food rations and child feeding programs leading to an increase in child malnutrition [130]. Nevertheless, low-cost sustainable strategies towards IYCF practices in the first 1000 days, from conception to the second birthday of a child are associated with optimal child growth and ability to thrive [131].

Children having optimal IYCF and childcare in the form of good personal hygiene and sanitation have a reduced risk of morbidity and mortality [132-134]. Further, SBCC programs founded on nutrition are associated with improved child feeding practices [15, 28]. Engaging communities in LMICs in both direct and indirect nutrition-focused interventions have been shown to improve both child feeding practices and growth [23]. Providing evidence that such interventions work in post-emergency settlements may improve nutrition programs and inform policies on maternal and child nutrition.

Care Group Model

A Care Group is a social group comprised of 10 – 15 members, also identified as community-based volunteers, who share in learning, training, and peer-to-peer supervision based on various health promotion aspects, to achieve social behavior change communication (SBCC) at the household and community level cost-effectively and sustainably [135]. The Care Group model was developed by Dr. Pieter Ernst in the 1990s as a way to enable communities to access health promotional messages within Mozambique after a protracted civil war of 17 years. Before the development of the Care

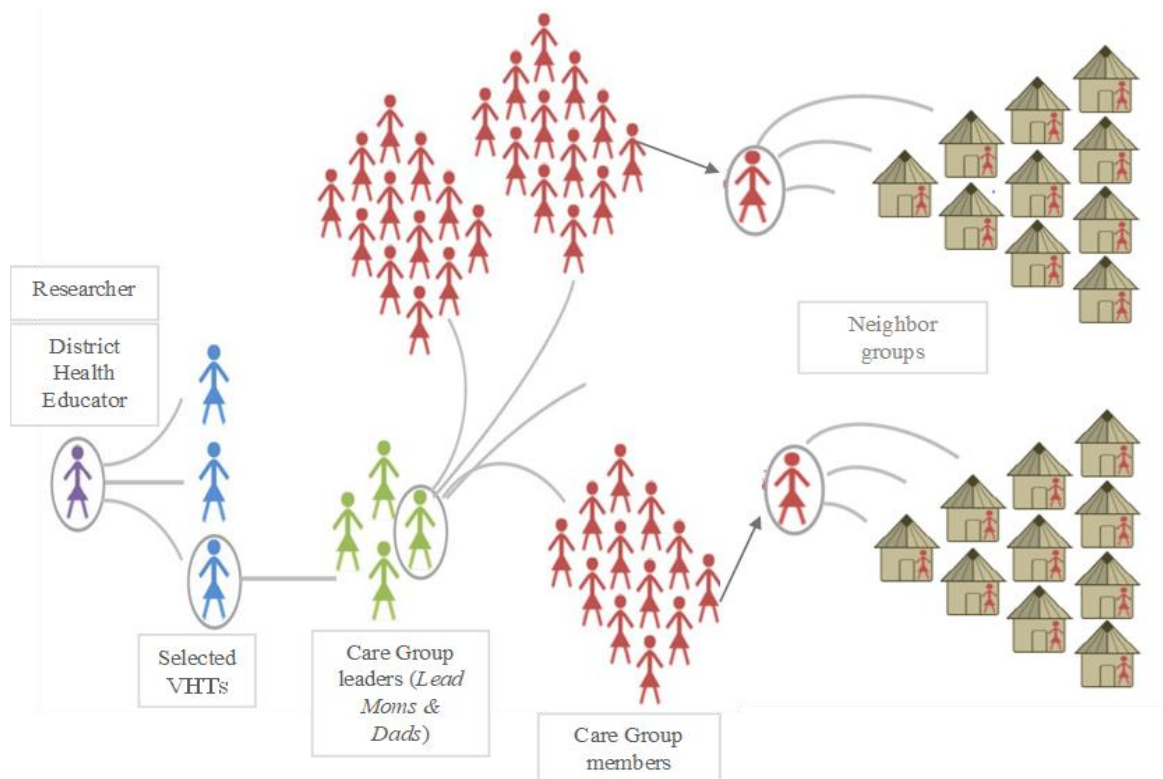
Group, there was a challenge as the 19 health promoters in the Gaza province in Mozambique could not effectively extend health services to the over 100,000 people in the community [117]. The general idea was to enable a network of volunteers trained by the health promoter to reach out to households as a strategy to address ways of preventing diseases as well as provide information and closer follow-up on health services access [121]. The initial project that used Care Groups (Vurhonga I project) from 1995 to 1999 and the follow-up project (Vurhonga II project) from 1999 to 2003 were hugely successful with a significant increase in child survival compared to other areas in Mozambique where the Care Group intervention was not implemented [117]. The success of the Care Group model led to its adaptation by varying countries and NGOs; however, evaluation of its success in post-emergency settlements remains limited.

How the Care Group model works

The Care Group model was designed to have approximately 10 – 15 community-based health volunteers. Each of these volunteers, who are selected for a leadership role in the Care Group, is a member of the community. These volunteers receive training and technical support from the health promoters who may be technical personnel from NGOs, the health facility, or the district health office. The volunteers have the responsibility to routinely visit some 10 – 15 households on a biweekly basis to discuss health-related topics.

Our study adopted the Care Group model to implement a peer-led integrated nutrition education intervention among refugees in the post-emergency settlements in the West-Nile region in Uganda. Our study designed a Care Group to consist of 10 – 20 members who were all women in their third trimester of pregnancy. From March to May,

the Care Group composition was revised to 5 – 10 members per meeting in addition to other safety operating procedures instated due to the COVID-19 pandemic. The group members selected a leader who was referred to as a lead mom or lead dad who worked voluntarily. The lead moms and dads were trained, supported, and supervised by selected village health team members (VHTs). The lead moms and dads would organize biweekly meetings with their respective Care Groups to discuss preselected health and nutrition education topics. The VHTs were trained and supported by the District Health Educator (DHE) together with the researcher on the project. The structure of the adapted Care Group model is shown in Figure II. 1 below.



Adapted from Food Security & Nutrition Network Social & Behavioral Change Task Force [135]

Figure 2.1: Care Group model adapted for this study

The Care Group model has the potential to sustainably improve health and nutrition practices such as child feeding practices, personal and household hygiene, and

community water, sanitation and hygiene (WASH) at the grassroots level [117, 121]. Further, the cascading effect of positive change in the Care Group model may support reducing the risk of malnutrition through improved child feeding practices. IYCF practices may be transformed and strengthened through social supportive structures including those naturally existing such as family, neighbors, and peers, or through formative social structures [101, 136]. Strong bonds in relationships among peer groups with similar challenges may provide the required commitment for effective community-based group nutrition education interventions [101]. Therefore, using the Care Group model to implement a peer-led integrated nutrition program among refugees in the post-emergency settlements may be beneficial based on the previous successes of the Care Group model in rural communities.

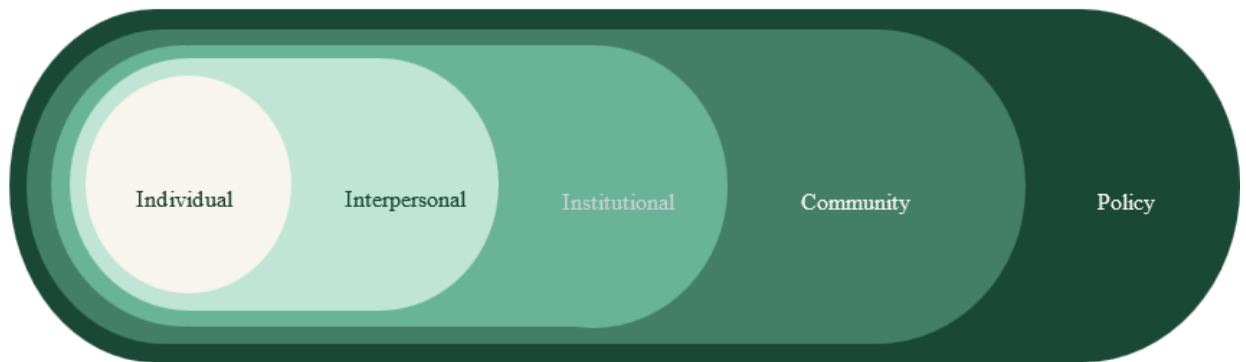
Theoretical Framework

The factors determining the behavior of child caregivers in an intervention targeting infant complementary feeding practices and growth may be well conceptualized through a theoretical model [101]. Using a peer-led integrated nutrition education intervention, our study was designed using a behavioral change approach to determine whether participating in the intervention would improve the feeding practices and growth of children compared to not participating in the intervention. Based on this behavioral change approach, the combination of the SEM [137] and the social cognitive theory (SCT) [138] was used to define both the model and theory of the study.

Social-ecological model (SEM)

The SEM explained the behavioral change approach of our study. The SEM posits that an individual's behavior and practices are a result of an interaction among the

individual, interpersonal, organizational, community, and policy-related factors (Figure II. 2). The behavior or practices may be a result of all factors or some of the factors in the SEM interacting depending on the level of engagement of activities for the desired change.



Source: https://www.atsdr.cdc.gov/communityengagement/pce_models.html

Figure 2.2: The Social-ecological model

In our study, only four of the five factors were utilized in implementing the peer-led integrated nutrition education intervention. The only factor not considered was the policy factor.

- i) **Community-level:** This study considered how household and community factors may affect the participation of the child caregivers in the Care Group intervention. Some of these factors included religion, socioeconomic status, and food insecurity.
- ii) **Organization level:** The Care Group intervention and the entire support structure of the intervention for this study were based at this level. The organization-level provided the intended action for the desired change.
- iii) **Interpersonal level:** This study considered the interpersonal interaction of the study participants with other people including friends, family, and

neighbors. These interpersonal interactions also influence the behavior change of an individual.

- iv) Individual-level: This was considered the level at which the desired behavior change was expected. The individual-level includes some personal characteristics of the participants. Also, at this same level, the interaction among other factors would influence the participants' beliefs, attitudes, and practices of IYCF.

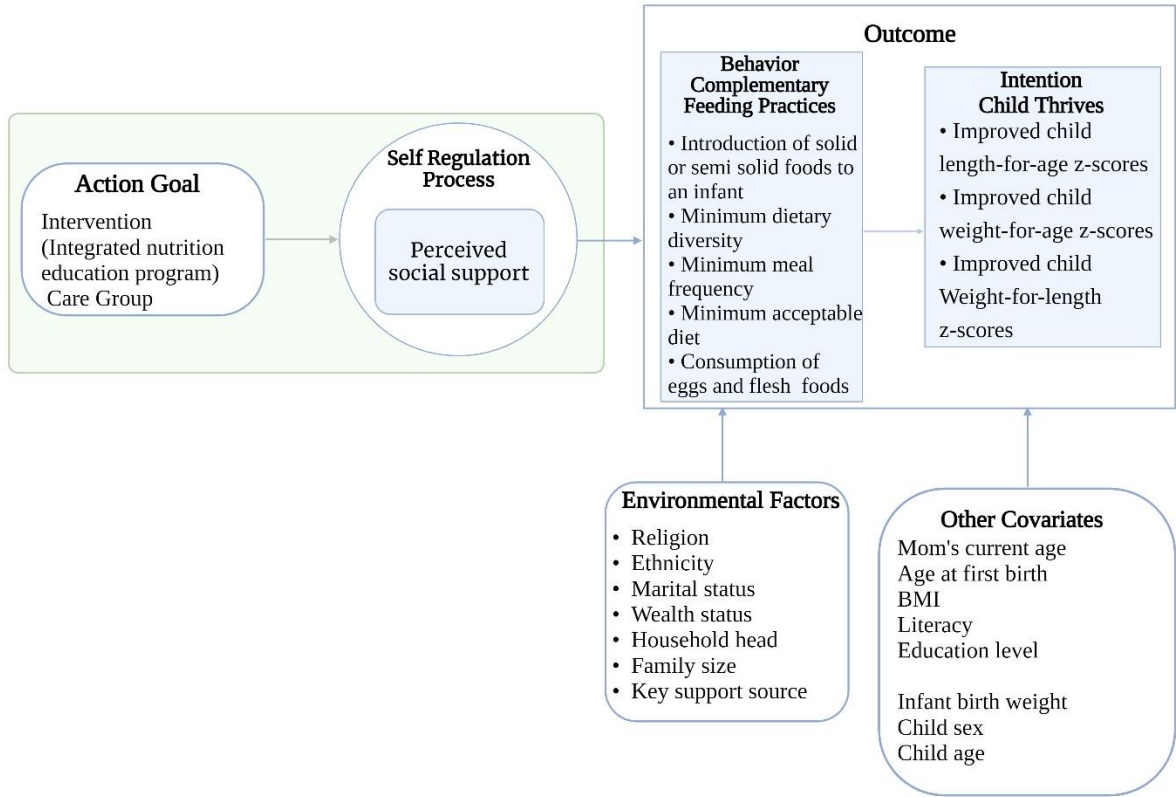
The integration of the SEM and SCT in this study further explains how the peer-led integrated nutrition education intervention influenced child complementary feeding practices and growth among refugees in post-emergency settlements.

Social cognitive theory (SCT)

Undernutrition is the main cause of child morbidity and mortality in LMICs [3]. Undernutrition occurs among children because of caregivers' inadequate child feeding practices and behavior patterns. Modification of these behavioral patterns would improve the care and feeding practices of a child leading to a reduction in undernutrition [139]. These behavioral patterns in the context of health are the different activities that an individual or group may perform with the expectation of better health through the prevention of diseases [140].

SCT describes how people understand the environment and social situation around them. Individuals can conceptualize and think of the best ways to act towards achieving a desired goal with consideration of the environment and resources at their disposal [141]. According to the SCT, this study posited that a mother's knowledge of child feeding practices can be directly acquired by observing their peers (Care Group

members) within the context of social interactions, experiences, and external influences. The SCT adopted in this study is shown in Figure II. 3. below.



Adapted from Stokols (142), Gregson, Foerster (143), Bandura (144)

Figure 2.3: Theoretical framework adapted for this study

In the SCT adapted for this study, the Care Group intervention which consisted of the peer-led integrated nutrition education program was the action of the study. The Care Groups as a peer-support program targeted maternal social support which was self-regulated according to the framework. The Care Group intervention together with the maternal social support was expected to influence the complementary feeding practices of infants and growth as the main outcomes of the study. However, the outcomes (child feeding practices and growth) may be influenced by some environmental factors and other personal covariates.

Definition of Terms

Post-emergency settlements: These are protracted politically stable environments in which the UNHCR and refugee host country continually provide for the well-being of refugees beyond the first two years of emergency [17, 77, 145].

Maternal social support: Social support involves all the resources available to an individual within their social network including friends, family, neighbors, and other informal support structures [146, 147]. These social support resources may be broadly categorized under emotional/informational support, positive social interaction support, tangible support, and affectionate support [102, 148].

Refugee: According to Article 1(A)(2) of the 1951 Convention as amended in 1967, any individual that is fleeing away from a life-threatening situation, for example, a natural calamity or act of God or a person escaping from persecution due to ethnicity, religion, gender, being affiliated with a political or social group to any country outside their nationality in fear for their lives in their home country [149, 150]. Specific to the African context, this study adopted the Organization of African Unity (OAU) definition framed in the OAU summit of 1969 in Addis Ababa which defined a refugee as any individual (s) living outside of his or her country of nationality due to a well-founded fear of being harmed because of their religion, race, social group affiliation or political opinion [6].

Host community: These are native or local people that share land space and live alongside or together with the refugees even though they have different cultures, beliefs, values, and practices [17].

CHAPTER III

METHODS

Introduction

This study used both quantitative and qualitative research methods to address the research objectives. The qualitative data were collected from focus group discussions (FGDs), and key informant interviews (KIIs). The qualitative data were collected in 2019 from respondents of the FGDs and KIIs at a cross-sectional level. The quantitative data were collected using an interviewer-administered questionnaire. The study quantitative data were collected in 2020 four time periods over the year. The quantitative study was a community-based randomized control trial (RCT) due to the involvement of various physical and social structures in the community [151]. Also, the engagement of adults and peer leaders in the planning and implementation of the intervention established this study as participatory action research [152]. This RCT was conducted to determine the effect of an integrated peer-led nutrition education intervention on infant nutrition and growth among refugees in post-emergency settlements in the West-Nile region of Uganda.

Study population and research setting

The study was conducted in the West Nile region of Uganda. The West Nile region is almost 420 kilometers from Kampala, the capital city of Uganda. The region borders South Sudan to the North and The Republic of Congo to both the West and South. The West Nile region had a population of 2,988,300 nationals also referred to as the host community. Additionally, 723,500 refugees were hosted within the West Nile region [153]. The refugees were settled within the host community on land assigned by the district local government to host refugees in consultation with the local cultural leaders. In these settlements, refugees were supported by the UNHCR, its partner agencies, and the Government of Uganda (GoU) to set up social amenities including health facilities, places of worship, protected water sources, and schools [153]. These facilities together with those existing in the host community were shared by both refugees and the host community depending on geographical proximity and ease of access.

The households in the West Nile region suffer from moderate food insecurity with the majority of the household income spent on food consumption. The main economic activity of the region is trade because of its proximity to the borders of South Sudan and the Republic of Congo. The people in the West Nile region also engage in mining, quarrying, agriculture, forestry, and fishing. As of 2020, eleven districts and one city made up the West-Nile region. These included Terego, Maracha, Pakwach, Nebbi, Zombo, Moyo, Yumbe, Adjumani, Obongi, Arua, Arua city, and Koboko [154].

This study used a multi-stage cluster randomized sampling [155] to select the Adjumani district and the post-emergency settlements for this study. Initially, five districts of the West-Nile region, Terego, Maracha, Pakwach, Nebbi, and Zombo were

not included in the randomization since they do not have any refugee settlements. Adjumani district was randomly chosen among the remaining six districts and a city (Moyo, Yumbe, Adjumani, Obongi, Arua, Arua city, and Koboko) that had hosted refugees for at least more than 2 years [20, 154]. By 2020, Adjumani, had a host community population of 237,400 and a total refugee population of 243,343 with 19 refugee settlements [153].

In the Adjumani district, the settlements of Maaji I, II, and III, as well as Mungula I and II were excluded from the randomization because of limited accessibility during the rainy season. The exclusion of the five settlements left 14 settlements in the sampling frame from which specific respondent communities were selected for the study. These 14 refugee settlements included Alere, Agojo, Ayilo I, Ayilo II, Baratuku, Boroli, Elema, Mirieyi, Nyumanzi, Olijji, Olua I and Olua II, Pagirinya I and Pagirinya II

Qualitative research methods

The qualitative data collection took place in July 2019 in the refugee settlements in the Adjumani district. Both FGDs and KIIs were used to provide qualitative data for this study. The refugee settlements of Ayilo, Nyumanzi, Pagirinya, and Boroli in the Adjumani district were randomly selected among fourteen eligible settlements for the sample. The five additional settlements (Mungula I, II, III, Mungula I, and II) were excluded from the sampling frame due to difficult access during the rainy season.

Focus group discussions (FGDs)

Refugee parents, South Sudanese refugee mothers (n=24), and fathers (n=24) having children less than 24 months of age and living in the post-emergency settlements of Adjumani district in the West-Nile region were recruited for FGDs. Village health

team members (VHTs), who are also known as community health workers, supported the identification and development of a list of mothers and fathers with children under 24 months in the refugee community. The researcher (JK) used a computer-based randomized selection to identify the final participants from the initial lists prepared by the VHTs. The researcher (JK) together with the VHTs mobilized the final participants selected through the computer randomization process.

A total of seven FGDs were formed as two Moms-only groups, two Moms & Dads combined (not as couples), and two Dads-only groups. The FGDs were mostly clustered by ethnicity to increase the comfort level of respondents based on group homogeneity, and thus a higher willingness to share opinions and thoughts [156]. Also, purposive sampling was used to identify another FGD of VHTs (F=4, M=4) to provide a wider and in-depth context to the subject of maternal social support among refugees in post-emergency settlements. Each of the focus groups had eight participants. The FGDs were conducted under secluded shades (trees or temporary shades made with tarps) at local community centers easily accessible to the participants in the refugee settlements. All groups were asked questions about maternal social support, infant and child feeding practices, and general child care. All FGDs were conducted by trained facilitators proficient in English and Arabic and at least the Dinka or Madi languages. Each FGD was supervised by the researchers (JK or HR).

All FGDs were audio-recorded while the FGDs facilitator and supervisor of research independently took extra notes during the FGDs. The average length of each FGD was 90 – 180 minutes, and the participants were provided with a soft beverage (500ml soda) and two small-sized biscuits because of the length of the FGD sessions.

Most of the participants of the FGDs came along with their index child for the FGD session which provided more confidence in the choice of participants and the views that were provided. The facilitators were encouraged to probe the participants on each of the questions until saturation was achieved. Saturation on each question was considered achieved when no more responses nor new information on the subject was being provided by the FGD members.

Key informant interviews

A total of nine key informants (F=1, M=8) were identified to be interviewed for this study. These KIIs included eight settlement commandants and one senior administrator at the settlement level in charge of gender and social protection from the Office of the Prime Minister (OPM) of Uganda. Settlement commandants are staff of the Government of Uganda (host government) who together with the coordinating staff of UNHCR oversee and harmonize the daily operations and activities among humanitarian partners within each settlement [157]. Similar to the VHTs, the key informants were also identified as key community resource personnel.

These key informants provided routine support for refugees' lifestyles and welfare within the post-emergency settlements [157-159]. The KIIs were conducted by researchers because the participants were proficient in English. The KIIs lasted an average of 90 minutes. The information provided by the key informants was valuable in the triangulation of the responses provided by the FGDs with parents and VHTs regarding the barriers, facilitators, and perceptions of maternal social support in the settlements.

Focus group discussion and key informant questionnaire

Interview guides were used both for FGDs and KIIs. Open-ended questions were used to probe the participants on the topics being investigated. The questions were developed based on previous literature and tools used to examine maternal social support [102, 148, 160]. The questions were reviewed and revised based on the comments of the research advisory committee. Some grammatical iterative modifications were done to identify perspectives of maternal social support from the participants, although the general context and format of the questions remained unchanged.

Each of the FGDs was conducted by selected facilitators. The researcher had a prior meeting with the facilitators for training on the questionnaire. The researcher and FGD facilitators also reviewed the questionnaires and agreed on the mode of questioning especially probing to achieve saturation and encourage equal and holistic participation. All the trained facilitators were proficient in English and Arabic, and at least the Dinka or Madi languages. Each FGD session was supervised by the researchers.

Data processing and analysis

Qualitative data was collected by conducting FGDs and KIIs among the selected participants. The probing on each question was considered to have been saturated when the participants of the FGDs and KIIs no longer provided any new responses. The FGDs were audio-recorded and Arabic, Madi, and Dinka languages were transcribed verbatim by research translators. However, the KIIs were audio recorded in English since all respondents could understand and speak English well. The FGDs recordings were reviewed simultaneously and transcribed by two research translators who re-listened to the audio recordings while going over the transcribed notes. The transcribed transcripts

were back-translated to English by a different research translator for each initial transcription. The KIIs recordings were transcribed verbatim by the researchers. Any discrepancies in the transcription were reviewed and discussed by the research team till a consensus was reached. The data were then coded using NVivo v. 12 (QSR International, Melbourne, Australia). The research team (JK, HR, and CW) reviewed and discussed emerging themes and patterns until a consensus was reached regarding major themes.

Validity and reliability

This study's interview protocol was reviewed by the research team and supervisors before the commencement of the study. The participants in the six FGDs of refugee parents were randomly selected from the identified refugee settlements to increase sampling diversity and have a broader representation of the findings. This study used open-ended questions with additional follow-up questions to probe the participants till saturation was achieved. The qualitative responses from all participants were triangulated which assisted with convergence, completion of themes, and reduction of discrepancies thus improving the validity of the study [161]. Further, validity and reliability were achieved by having the research team review and discuss the disagreements on codes and themes until a consensus was reached to develop a final code and theme structure.

Quantitative research methods

Study participants

The quantitative data collection began in January 2020. A community-based multistage cluster-randomized controlled trial (RCT) was conducted among refugee post-emergency settlements in the West Nile region in Uganda. The Adjumani district had

been randomly selected among six districts and one city hosting refugees in the region as further described under the qualitative methods. Initially, three settlements in the Adjumani district were randomly selected and assigned to the three arms of the study. Ayilo-I settlement was assigned as a Moms-only treatment arm, and Pagirinya settlement was the Moms & Dads treatment arm while Nyumanzi settlement was the Control arm. During the recruitment of the participants, some fathers in the settlement (Pagirinya) assigned to the Moms & Dads treatment could not commit to participating in a yearlong study because they had to move away from the settlement for jobs back in Juba, the capital of Sudan or nearby towns with more employment opportunities. Because of the limited numbers of participants in the Moms & Dads arm, a second randomization was done excluding the already selected settlements. Ayilo II was then selected as the other settlement to identify respondents for the Moms & Dads treatment arm. These settlements were at least six kilometers apart to reduce the possibility of spillover effects of the intervention. The VHTs and health center midwife assistants supported the identification of pregnant mothers to be included in the study.

Sample size

Prompt introduction of solid and semi-solid foods to infants was used as the primary outcome to determine the sample size because of its reliability as an indicator of infant and young child feeding practices. A sample size of 317 mothers was desired for strong power, based on calculations using GPower 3.1 software, with a type I error of 0.05, a power of 0.90, and an effect size of 0.2 [32, 125] to detect differences in the proportions of infants introduced to complementary foods at 6-8 months among the 3 study arms. A 23 percent loss during follow-up was estimated; thus, 390 women (15-49

years of age) in their third trimester of pregnancy were willing to participate. These women were enrolled before baseline data collection. Husbands were eligible to participate with their wives in the Moms & Dads treatment arm. A total of 321 mother-infant dyads completed the study. A sample size diagram is illustrated in Figure III.1.

Purposive sampling was used to identify pregnant women in their 3rd trimester to be included in the study. VHTs and a midwife assistant from each settlement were contacted to support the respondent identification process due to their community roles in promoting health among expectant mothers. Identified pregnant women were crossmatched with an integrated maternity register from the health facility. Verification of pregnancy term was done with the help of the midwife assistant, VHT, and researcher (JK) by validating records in the antenatal card or maternity records book.

Inclusion and exclusion criteria

- Pregnant women of reproductive age (15 - 49 years) in their third trimester were eligible to participate in the study.
- Mothers who gave birth to premature infants or with congenital abnormalities or whose babies died had the discretion to remain in the study, but their data would not be included in the final analyses.

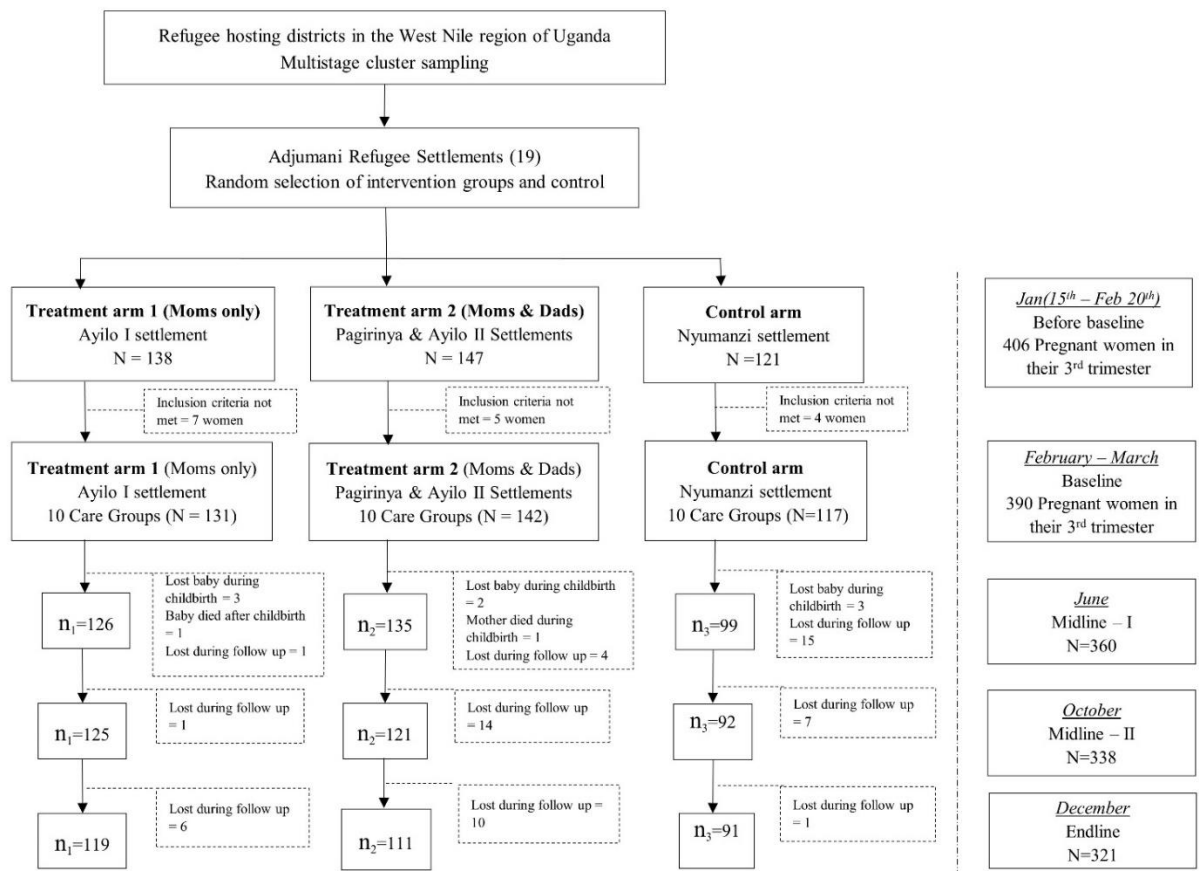


Figure 3.1: Sample size chart of participants in this study

Each of the chosen settlements formed the household sampling frame for one arm of the study; that is, each settlement had either: 1) Moms-only, 2) Moms & Dads combined, or 3) Control arm. The participants in the study were followed up from recruitment in January 2020 to the end of the study in December 2020.

Study Intervention

A peer-led integrated nutrition education training program using the Care Group model developed by the Technical and Operational Performance Support (TOPS) program [135] comprised the intervention. We hypothesized that participants in the Care Group intervention would have better peer support and would have improved infant

complementary feeding and growth compared to the participants in the control arm. For the intervention arms, topics trained in the peer support groups included 1) group dynamics and social support, 2) optimal breastfeeding and complementary feeding practices, 3) adequate basic hygiene, 4) child growth and development, and 5) fathers' involvement. A completed script of the training modules is attached as Appendix 3. The training messages were adopted and modified from the community health extension workers (CHEWs) training handbook [162] and the United Nations Children Emergency Fund (UNICEF) infant and young feeding counseling cards for community workers (UNICEF, 2020). Selected images were included in each module for illustration adopted from the UNICEF-IYCF counseling cards for community workers.

Intervention groups

In this study, Moms-only and Moms & Dads arms comprised the treatment arms also referred to as the intervention arms. The Control arm was the third study arm but did not receive the intervention. Each study arm comprised 10 groups with 10 – 20 members per group. For the study arms, volunteer leaders were selected within each group by the members. These leaders were referred to as peer group leaders. For the intervention arms, the peer group leaders were trained for five days using the same training tool that was to be used during the Care Group meetings. The peer group leaders were trained by identified village health team (VHTs) together with a nutrition and health educator from the Adjumani district. Only one refresher training for the peer group leaders was done during the entire study period even though at least two refresher trainings had been planned. The failure to conduct additional refresher training was due to measures undertaken to observe COVID-19 safety operating procedures (SoPs). Nevertheless,

monthly feedback meetings were held for the peer group leaders with the VHTs to harmonize group meeting plans and address any challenges. These monthly meetings were also attended by the researcher. Each of the peer group leaders facilitated integrated nutrition training modules on a biweekly basis to the 10 to 20 group members identified in a Care Group to effect behavioral change. The group members were also encouraged to visit each other's homes as part of peer follow-up, however, caution to COVID-19 SoPs was emphasized.

Standard of care/ Control arm

The Government of Uganda (GoU), through a network of community volunteers known as Village Health Teams (VHTs), links with communities at the grassroots level to promote primary health care, best hygiene and sanitation practices, and nutrition [163]. These VHTs are community volunteers identified by the community. They are provided with basic training in health and nutrition education to mobilize and sensitize their communities on better health and nutrition practices, and to prompt increased access to existing health services in the community [158]. In 2009, the GoU adopted a curriculum [164] for infant and young child feeding based on the UNICEF IYCF guidelines to train health and nutrition professionals and community health extension workers including VHTs.

The GoU recommends having at least two VHTs in a village, which is between 50 and 70 households. These VHTs report directly to the nearest government health facility. Additionally, the VHTs promote government health programs and urge community members to access health-related services from government facilities. In this study, the Control arm comprised a standard of care that was expected to involve VHTs doing their

routine work in the community supporting households concerning nutrition and health information for better maternal and child health.

Data collection

The structured questionnaire used for this study was adapted from the Demographic and Health Surveys [47] and UNHCR standardized expanded nutrition surveys (SENS) guidelines [48]. These two questionnaires have been widely accepted for sociodemographic, health, and nutrition data collection and related information for nationally representative samples and humanitarian populations. Additional questions to assess maternal social support were adopted from the medical outcomes study (MOS) social support scale [102]. The final questionnaire was translated into Arabic, Dinka, and Madi languages which are widely spoken by the South Sudanese in the refugee settlements in Uganda. The questionnaires were then uploaded onto electronic tablets (Lenovo Tab P11) using the Qualtrics software (Offline version). The collected data with the electronic tablets were uploaded to Qualtrics cloud storage at the end of each data collection day. Only the principal investigator and research collaborators had access to the data as part of maintaining respondent data safety.

Our study used four enumerators, also referred to as data collectors, (F=3, M=1) at each data collection point throughout the study. These four enumerators with a minimum qualification of an associate degree in nutritional science, social sciences, or related fields were recruited and trained on the questionnaire. Each enumerator was proficient in English and Arabic and one of the local languages (Madi, Nuer, or Dinka). Each question was reviewed, and a consensus was agreed upon with the researcher on how to ask the questions and extra probing where necessary. A total of 10 households

with women pregnant in their 3rd trimester were used to pretest the questionnaire in the Boroli refugee settlement. The Boroli refugee settlement where the pretesting was done was not among the settlements that were selected for the year-long study. The researcher was able to make minor revisions and adjustments mostly regarding the flow of questions in the Qualtrics software. Data collectors/enumerators were blinded from the study arm assignment. The collection of data/information from a single respondent was completed within 1 hour and 30 minutes. The data collection time points for this study are summarized in table III.1. At each data collection period, the participants were provided with a 1 kg bar of washing soap, 200 mL of vitamin A fortified cooking oil, and half a kilo each of iodized salt and sugar, all worth about 7,600 Ugx (1.5 USD) as compensation for participation in the study.

Table 3.1: Summary of the data collection time points during the intervention period

Subjects	Baseline	Midline 1: 3 months after birth	Midline II: 6 months after birth	Endline: 9 months after birth
Mothers	Sociodemographic data Maternal social support Food insecurity Maternal height	Sociodemographic data Maternal social support Food insecurity	Introduction of solid or semi-solid foods to the infant Infant minimum dietary diversity Infant minimum meal frequency Infant minimum acceptable diet Eggs or flesh foods consumption by the infant Maternal social support	Introduction of solid or semi-solid foods to the infant Infant minimum dietary diversity Infant minimum meal frequency Infant minimum acceptable diet Eggs or flesh foods consumption by the infant Maternal social support Maternal weight Maternal height
Infants		Infant birth weight Infant growth indicators (length-for-age z-scores (LAZ), weight-for-age z scores (WAZ) and weight-for-length z-scores (WLZ))	Infant growth indicators (length-for-age z-scores (LAZ), weight-for-age z scores (WAZ) and weight-for-length z-scores (WLZ))	Infant growth indicators (length-for-age z-scores (LAZ), weight-for-age z scores (WAZ) and weight-for-length z-scores (WLZ))

Study variables

Independent variables

1. Study arms: All participants in the study were assigned by settlement to one of the three study arms, Moms-only, Moms & Dads, and the Control.
2. Time: Infant growth indicators were collected at Midline-I, II, and Endline. Complementary feeding practices of infants were assessed at the Midline-II and Endline study periods. However, maternal, household, and other infant characteristics were collected during the four different study periods as illustrated in the study Gantt chart (Figure III.2)
3. Maternal social support: The perceived maternal social support was assessed using the MOS social support scale.

Dependent variables

1. Introduction of solid and semi-solid or soft foods, infant minimum dietary diversity, minimum meal frequency, infant minimum acceptable diet, and infant consumption of eggs and or flesh foods
2. Infant nutritional status (length-for-age z-scores (LAZ), weight-for-length z-scores (WLZ) and weight-for-age z-scores (WAZ))

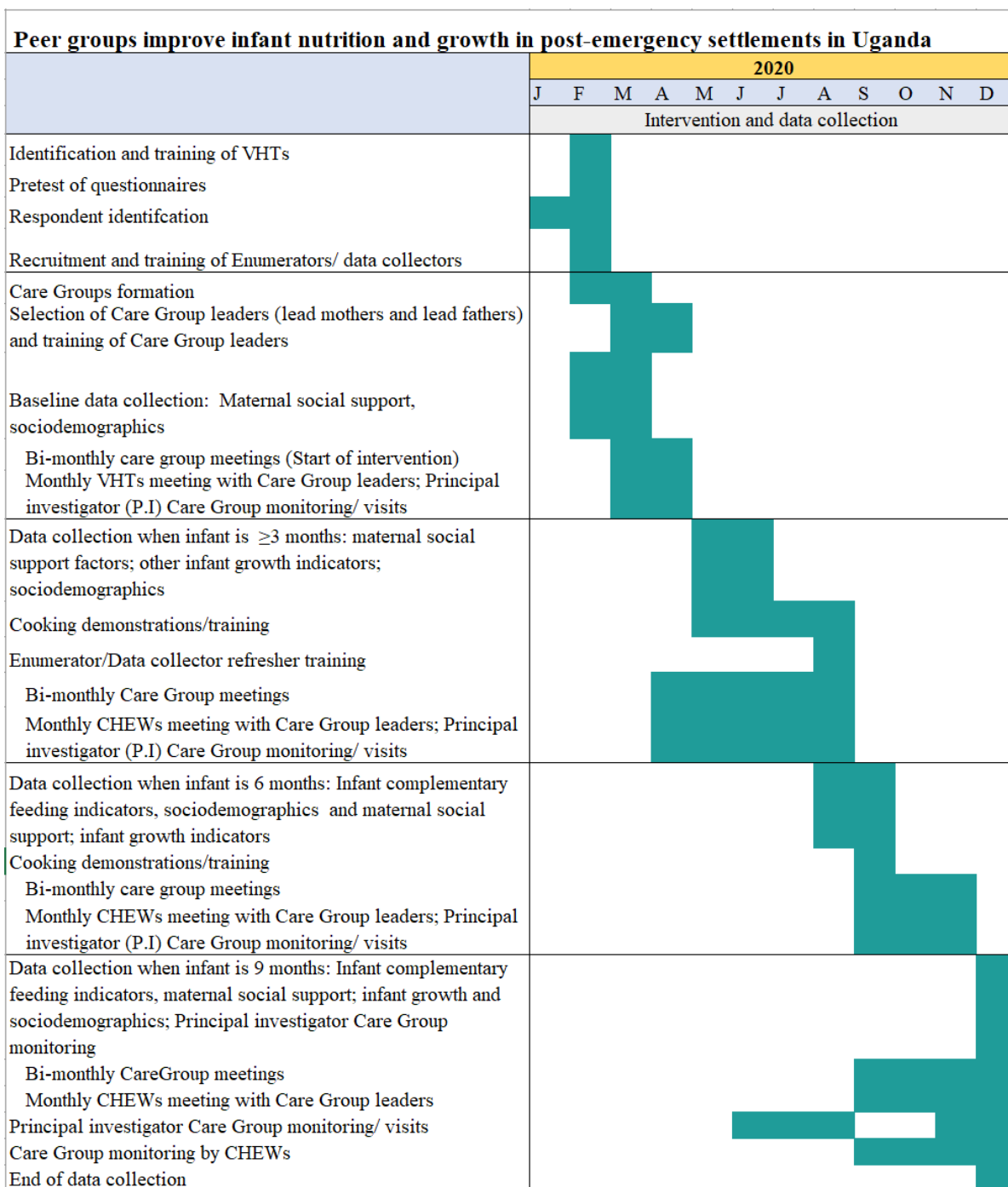


Figure 3.2: Study Gantt Chart

Confounding variables

The study adjusted for potential confounding variables in analyses to improve the validity of the results [155]. The covariates used in this study included household head, wealth index, years spent in refugee settlement, maternal education, who supports the mother most, ethnicity, body mass index, religion, child sex, birth weight, and household food insecurity. Household food insecurity was assessed using the Household Food Insecurity Access Scale (HFIAS) [165]. The household wealth index was calculated using principal component analysis (PCA) and then categorized into quintiles [115].

Assessment of variables

Measurement of social support

The Medical Outcomes Study (MOS) Social Support Index was used to assess maternal social support [102]. Higher social support scores were used as a proxy for better maternal social support. Using the MOS social support scale, 19 questions with a five-point Likert scale were asked of the participants with an emphasis on infant feeding and care (Table III.2.). The participants expressed their level of support based on the questions with responses ranging from “*none of the time*” (score of ‘1’) to “*all of the time*” (score of ‘5’). The scale has 19 items categorized based on four functional subscales: emotional/informal support (8 items); tangible support (4 items); affectionate support (3 items); and positive social interaction (3 items). An additional item assessing support from others that enables individuals to keep their minds off stressful things is added to complete the 19-item scale. An interrater reliability of 0.97 has been reported for the MOS social support scale [102]. For the current study, the questions in the scale were reworded because the study context was different making it logical to modify based on

discoveries in our formative study conducted the previous year. The MOS Social Support scale has recently been adapted in assessing maternal social support among rural communities in LMICs [36, 41].

Table 3.2: Questions used to assess social support

	<i>Emotional/informational support</i>
1.	Someone you can count on to listen to you when you need to talk
2.	Someone to give you information to help you understand a situation
3.	Someone to give you good advice about a crisis
4.	Someone to confide in or talk to about yourself or your problems
5.	Someone whose advice you really want/need
6.	Someone to share your most private worries/concerns and fears with
7.	Someone to turn to for suggestions about how to deal with a personal problem
8.	Someone who understands your problems
	<i>Tangible support</i>
1.	Someone to help you if you were confined to bed when sick
2.	Someone to take you to the health facility if you needed it
3.	Someone to prepare your meals if you were unable to do it yourself
4.	Someone to help with daily chores if you were sick
	<i>Affectionate support</i>
1.	Someone who shows you affection and care
2.	Someone to make you feel respected
3.	Someone who hugs you/ embraces you
	<i>Positive social interaction</i>
1.	Someone to have a good time with
2.	Someone to get together with for relaxation
3.	Someone to do something enjoyable with
	<i>Additional item</i>
1.	Someone to do things with to help you get your mind off worries

The overall social support score was calculated by obtaining the average of the scores for all the 19 items (Table III.2.). Then the scores were transformed to a 0 – 100 scale using the formula indicated below.

$$100x \frac{(\text{observed score} - \text{minimum possible score})}{(\text{maximum possible score} - \text{minimum possible score})}$$

Also, the MOS social support scale was used as a categorical variable based on the total average of the scores for all the 19 items of the MOS scale questions for each respondent. The social support based on their total mean score was categorized as optimal (>4 and ≤5); moderate (>3 and ≤4), low (>2 and ≤3), and none or very low support (≤2).

Infant and mother's anthropometric measurements

Child growth was assessed using WHO growth indicators starting at Midline-I, then Midline-II, and Endline [128]. Infant anthropometry measures were done in duplicate, then, the average was calculated to determine the weight and length to be used in the analyses. The child's age was acquired through interviewing the mother and cross-checking birthdates with the child's health card [166]. The mom's and child's weight were measured simultaneously using a two-in-one SECA 874 digital scale. All weight measurements were recorded in kilograms to the nearest decimal point. Additionally, infant recumbent length was measured to the nearest 0.1 cm using a portable plastic infantometer for all data collection periods using WHO guidelines [167]. The mother and research assistant helped the researcher to lay the infant on the plastic infantometer and firmly pushed back the knees during the measurement of the infant's length. The mother's height was measured to the nearest 0.1 cm using a wooden height board. For both length/height and weight of the infant and mother, the respondents wore light clothing and no shoes when the measurements were being taken. The mid-upper arm circumferences (MUAC) for children were done using a MUAC tape at Midline-II and Endline of the study [168].

Infant growth indicators were calculated as z-scores. The z-scores were determined as the difference between the median measurement of the reference population and the child's anthropometric measurement adjusted for sex and age. These indicators included length-for-age z-scores (LAZ), weight-for-age z-scores (WAZ), and weight-for-length z-scores (WLZ) [128]. A z-score of less than -2 indicated the presence of growth failure in a child. If a child had LAZ less than -2 , then they were considered stunted, those with WAZ less than -2 were considered underweight and children with WLZ less than -2 were considered to be wasted. The child LAZ, WAZ, and WLZ were computed using the ENA for SMART 2011 software.

Assessment of infant complementary feeding practices

The child feeding variables were measured based on maternal recall of the feeding practices for the infants within the previous day. The complementary feeding practices assessed included the introduction of solid and semi-solid foods (ISSSF), minimum dietary diversity (MDD), minimum meal frequency (MMF), minimum acceptable diet (MAD), and consumption of eggs and or flesh foods (EFF). Details of the calculation of each complementary feeding practice are elaborated in Appendix 1. All child feeding practices were assessed using the WHO IYCF questionnaires to determine whether the child “met” or “did not meet” the feeding practice [79].

Statistical analyses

Descriptive statistics for key variables were performed with distribution and frequencies tabulated and calculated as a percentage of the total. Also, proportions of participants' characteristics including practices of complementary feeding and infant growth were calculated. Analysis of variance (ANOVA) was performed to determine the

differences in the mean scores of variables (continuous) among the different study arms. Chi-square tests were used to test for the difference in the proportion of categorical variables among study arms. Further, split-plot factorial ANOVA was used to examine mean infant growth (LAZ, WAZ, WLZ) differences based on the interaction effects of Care Group intervention and maternal social support among the study arms over the three-time study points.

Exploratory analyses were performed to evaluate the multicollinearity of the explanatory variables. The variance inflation factor (VIF) (<10) and the tolerance test (<0.2) were within acceptable limits. Logistic regression was used to examine the effects of the Care Group intervention on the complementary feeding of infants. Further, logistic regressions were performed to examine the associations between maternal social support and practices of complementary feeding of infants at the Midline-II and Endline periods of the study. Statistical significance of $P < 0.05$ was used. Data analyses were performed using STATA/ SE v17.0 (Stata Corp LLC, Lakeway Drive, TX, USA) and Statistical Package for the Social Sciences (SPSS), v. 26 (IBM® SPSS® Statistics, Armonk, NY). Table III.3. shows a summary of the key statistical methods used in this study.

Table 3.3: Summary of statistical methods used in the study

Research Question	Independent Variable(s)	Source of independent variable(s)	Dependent Variable(s)	Source of dependent variable(s)	Analyses
1. <i>Did the complementary feeding practices of infants significantly differ among the study arms?</i>	Study arms (categorical)	Study arm 1: Moms-only w/ intervention Study arm 2: Moms & Dads w/ intervention Study arm 3: Control/no intervention	Categorical variables a) Introduction of solid, semi-solid, or soft foods b) Minimum dietary diversity c) Minimum meal frequency d) Minimum acceptable diet e) Consumption of eggs or flesh foods Measure Meets/ doesn't meet	Source: Questionnaire for the mother on infant feeding practices Specifics: <ul style="list-style-type: none"> • Introduction of solid, semi-solid, or soft foods • Minimum dietary diversity • Minimum meal frequency • Minimum acceptable diet • Consumption of eggs or flesh foods 	Chi-square Test models Moms-only vs Control Moms & Dads vs Control
2. <i>Was there a significant difference in infant growth among the study arms over the study period?</i>	1) Study arm (categorical) 2) Time (categorical)	1) Participation in different intervention arms (Study arms 1 and 2) and the Control arm) Specific study arm enrollment over time i.e., Midline-I,	Categorical variables were computed from the infant growth z-scores. <ul style="list-style-type: none"> • length-for-age z-scores (LAZ) for stunting • Weight-for-age z-scores (WAZ) for underweight 	Source: Infant anthropometric measurements (weight, length) and records(age) Specifics: <ul style="list-style-type: none"> • Length-infant length in centimeters • Weight in kilograms Age in months	Chi-square Test models Moms-only vs Moms & Dads vs Control

Research Question	Independent Variable(s)	Source of independent variable(s)	Dependent Variable(s)	Source of dependent variable(s)	Analyses
		Midline-II, and End line	<ul style="list-style-type: none"> • Weight-for-length z-scores (WLZ) for wasting (LAZ less than - 2, considered stunted; WAZ less than - 2, considered underweight; WLZ less than - 2, considered wasted.) Measure Stunted, Wasted, Underweight		
<p>3. <i>Did the Care Group intervention improve complementary feeding practices in the treatment arms compared to the Control arm?</i></p>	Study arm (categorical)	<p>Study arm 1: Moms-only w/ intervention Study arm 2: Moms & Dads w/ intervention Study arm 3: Control/no intervention</p>	<p>Categorical variables</p> <ul style="list-style-type: none"> a) Introduction of solid, semi-solid, or soft foods b) Minimum dietary diversity c) Minimum meal frequency d) Minimum Acceptable diet e) Consumption of Eggs or flesh foods Measure	<p>Source: Questionnaire for the mother on child feeding practices</p> <p>Specifics:</p> <ul style="list-style-type: none"> • Introduction of solid, semi-solid, or soft foods • Minimum dietary diversity • Minimum meal frequency • Minimum acceptable diet • Consumption of eggs or flesh foods 	<p>Multivariable Logistic regression</p> <p>Test models</p> <p>Moms-only vs Moms & Dads vs Control</p> <p>Confounders</p> <ul style="list-style-type: none"> - Household head - Food insecurity - Wealth index - Years spent in the refugee settlement

Research Question	Independent Variable(s)	Source of independent variable(s)	Dependent Variable(s)	Source of dependent variable(s)	Analyses
			Meets/ doesn't meet		<ul style="list-style-type: none"> - Maternal education - Who supports the mother most - Ethnicity - Body mass index - Religion - infant sex - Infant birthweight
4. <i>Was there a difference in the interaction effects of Care Group and maternal social support on infants' mean growth among the different study arms?</i>	1) Study arm (categorical) 2) Time (categorical) 3) Social support (continuous)	2) Participation in different intervention arms (Study arms 1 and 2) and the Control arm) 3) Specific study arm enrollment over time i.e., Midline-I, Midline-II, and End line 4) Source: Questionnaire	Continuous (z-scores) (infant growth indicators/ infant nutritional status) Measure <ul style="list-style-type: none"> • length-for-age z-scores (LAZ) for stunting • Weight-for-age z-scores (WAZ) for underweight • Weight-for-length z-scores (WLZ) for wasting 	Source: Infant anthropometric measurements (weight, length) and records(age) Specifics: <ul style="list-style-type: none"> • Length-infant length in centimeters • Weight in kilograms • Age in months 	One-between, one-within split-plot Factorial Between: Moms-only vs Moms & Dads vs Control Within/Repeated at Midline-I, Midline-II, and End line Confounders <ul style="list-style-type: none"> - Maternal height - Respondent Sex - Infant sex - Maternal education - Paternal education - No. of children in Household (HH)

Research Question	Independent Variable(s)	Source of independent variable(s)	Dependent Variable(s)	Source of dependent variable(s)	Analyses
					<ul style="list-style-type: none"> - Length of stay in the settlement - Infant age - Maternal age - HH wealth index - Household food insecurity
<p>5. <i>Was there a relationship between Maternal support and Complementary feeding of infants</i></p>	<p>Social support (categorical) Maternal social support (categorical) based on Moms mean total scores were categorized as optimal (>4 and ≤5); moderate (>3 and ≤4), low (>2 and ≤3), and none or very low support (≤2)</p>	<p>Source: Questionnaire</p>	<p>Categorical variables</p> <ul style="list-style-type: none"> a) Introduction of solid, semi-solid, or soft foods b) Minimum dietary diversity c) Minimum meal frequency d) Minimum acceptable diet e) Consumption of eggs or flesh foods <p>Measure Meets/ doesn't meet</p>	<p>Source: Questionnaire for the mother on child feeding practices Specifics:</p> <ul style="list-style-type: none"> • Introduction of solid, semi-solid, or soft foods • Minimum dietary diversity • Minimum meal frequency • Minimum acceptable diet • Consumption of eggs or flesh foods 	<p>Multivariable logistic regression Test models</p> <ul style="list-style-type: none"> - Moms-only vs Moms & Dads vs Control. <p>Analyses at Midline-II and Endline.</p> <p>Confounders</p> <ul style="list-style-type: none"> - Household head - Years spent in the refugee settlement - Who supports the mother most - Maternal occupation - Maternal age - Maternal education - Ethnicity

Research Question	Independent Variable(s)	Source of independent variable(s)	Dependent Variable(s)	Source of dependent variable(s)	Analyses
					<ul style="list-style-type: none"> - Religion - Number of living children - Household food insecurity

Approval of study ethics

This study was approved by the Institutional Review Boards of the Uganda National Council of Science and Technology (SS 5038), Makerere University School of Health Science Research and Ethics Committee (SHSREC REF:2019-020), and Oklahoma State University (HS-19-2). Additional approval was acquired from the Office of the Prime minister (OPM) Uganda (OPM/R/107). Informed consent was gotten from all respondents at recruitment for participation in the study, and before data collection during the study. The enumerators documented the verbal consent procedure by signing with their initials or signature on the consent page given the low literacy of the mothers. All participants were informed of their right to withdraw from the intervention or interviews during the data collection exercise.

CHAPTER IV

BARRIERS, FACILITATORS, AND PERCEPTIONS OF MATERNAL SOCIAL SUPPORT AMONG SOUTH SUDANESE REFUGEES IN THE POST-EMERGENCY SETTLEMENTS IN THE WEST-NILE REGION IN UGANDA

Abstract

Interventions targeting social behavioral change communication (SBCC) such as social support have been shown to improve maternal, child health and nutrition. However, few studies have been conducted to evaluate the effectiveness of maternal social support strategies in post-emergency settlements. Further, there is limited literature describing the nature of maternal social support among refugees in post-emergency settlements. This study examined the barriers, facilitators, and perceptions of maternal social support among refugees in post-emergency settlements in the West-Nile region in Uganda. Qualitative (triangulation) methods were used. Focus group discussions were conducted for 7 groups (Moms-only (2), dads only (2), Mom & dads [not couples] (2), and village health teams [VHTs] (1)) each with 8 members. Key informant interviews (KIIs) were conducted with 9 community leaders. All interviews focused on maternal

social support. The audiotaped interviews were transcribed verbatim, translated, and coded for content. Themes were developed, linked, and compared to address the purpose of the study. Maternal social support had three categories of barriers including lack of resources, cultural norms, and spousal consensus on roles. Five facilitators were community and culture, physical and tangible support, social support structures, support sources, and extended postpartum rest. Four perceptions of social support identified were social interactions, financial support, advice and counseling, and mothers feeling some level of support. Humanitarian agencies and partners aiming to improve maternal and child health and nutrition of refugees in post-emergency should consider programs and policies targeting SBCC approaches grounded in maternal social support.

Introduction

The United Nations High Commissioner for Refugees (UNHCR) 2020 reported that the refugee crisis had doubled in the past 10 years especially in low-and-middle-income countries (LMICs) [1]. Uganda, with 1.4 million refugees, was ranked third together with Pakistan among nations hosting displaced people [2]. The majority, 62 percent of the refugees hosted in Uganda, fled South Sudan in 2013 due to the prolonged civil unrest [3, 4]. These refugees in Uganda, the majority of whom are women and children, are supported by UNHCR, partner agencies, and the Government of Uganda (GoU) [5]. Also, the local host communities and the refugees in the settlements serve an important role as support networks for one another as part of peaceful co-existence [5, 6].

Social networks are disrupted among refugees during the onset of an emergency, increasing the vulnerability of displaced people [7-9]. However, novel social networks are established among displaced people in their host communities [10-12]. Nevertheless, the vulnerability among the refugees at the onset of displacement may lead to social connections of limited importance or convenience beyond social connectedness in the emergency [7]. Hence, building both informal and formal networks in protracted refugee settings may improve their coping strategies and suitability for self-reliance [13, 14]. The GoU allows refugees free movement, interaction with the local hosting communities, and pursuit of livelihood opportunities as part of its refugee policy [15]. Unlike neighboring hosts, such as Kenya and Ethiopia, that restrict refugee activities within camps, Uganda allows for more social incorporation including setting up of local administrative structures and social services access similar to those of the host community [5, 6, 16]. The integration of refugees in Uganda overseen by the Office of the Prime Minister

(OPM) and UNHCR fosters the creation of larger social networks at the interpersonal and community levels to improve support for individuals.

Social networks are a web of social relationships that individuals have with peers and other persons [17-19]. These networks, also referred to as social support, impact a person's lifestyle, choices, and access to resources [20]. Social support improves access to information, physical support, emotional support, resolution of challenges and the ability to thrive [21-25]. Further, through social support, refugees empower one another in solving non-financial problems, providing childcare [19], and working towards improved health in their communities [26, 27].

Previous community studies in Asia [28-32], Kenya, and Uganda [33-35] showed that interventions targeting maternal social support improved maternal and child health. Yet, research to understand the context of social support among refugees in post-emergency in LMICs remains limited [8, 36, 37]. Further, no study to our knowledge has inquired about maternal social support among South Sudanese refugees hosted in LMICs such as Uganda. Therefore, this study examined the barriers, facilitators, and perceptions of maternal social support among refugees in the post-emergency settlements in the West-Nile region in Uganda. This research sought to answer the questions; 1) What resources in the community improved or deterred maternal social support? 2) How do mothers, fathers, and leaders perceive maternal social support? Findings from the study will assist in developing social behavioral change communication (SBCC) grounded interventions and sustainable programs for improving maternal and child health in post-emergency settlements in Uganda.

Methods

Study design

This study analyzed qualitative data from refugee mothers and fathers of children under 24 months of age in post-emergency settlements; their barriers, facilitators, and perceptions of maternal social support towards child nutrition and care were investigated. We used both single and mixed-sex focus group discussions (FGDs) during the interviews to explore the topic of maternal social support. Also, key informant interviews (KIIs) were conducted with selected community resource persons to obtain a wider range of possible responses including factors that may be considered socially sensitive [38].

Sample and setting

The refugee settlements of Ayilo, Nyumanzi, Pagirinya, and Boroli in the Adjumani district were randomly selected among fourteen eligible settlements after five additional settlements (Maaji I, II, III, and Mungula I and II) were excluded from the sampling frame due to difficult access during the rainy season. South Sudanese refugee mothers (n=24) and fathers (n=24) having children less than 24 months of age and living in the post-emergency settlements of Adjumani district in the West-Nile region were recruited. A total of six FGDs were formed as two Moms-only groups, two Moms & Dads combined (not a couple), and two Dads-only groups. Each of the focus groups had eight participants. The FGDs were conducted under secluded shades (tree or temporary shades made with tarp) at local community centers easily accessible to the participants in the refugee settlements.

Village health team members (VHTs) who are also known as community health workers supported the identification and development of a list of mothers and fathers

with children under 24 months in the refugee community. The researcher (JK) used the computer-based randomized selection of the final participants from the initial lists prepared by the VHTs. The researcher (JK) together with the VHTs mobilized the final participants selected through the computer randomization process.

Additionally, purposive sampling was used to identify one group of VHTs (F=4, M=4) and nine key informants (F=1, M=8) who included eight settlement commandants and one senior administrator at the settlement level in charge of gender and social protection from the OPM of Uganda. Settlement commandants are host government officers that oversee and harmonize the daily operations and activities among humanitarian partners within each settlement [39]. The VHTs and settlement commandants were key community resource personnel because of the value these persons had in the support of refugee lifestyle and welfare [39-41]. These key personnel provided valuable information regarding barriers, facilitators, and perceptions of maternal social support in the settlements.

Data collection

The FGDs and KIIs were conducted in September 2019. The purpose of the study was explained to the participants, after which each respondent signed or used a thumbprint to consent to participation in the study. The FGDs were mostly clustered by ethnicity to increase the comfort level of respondents based on group homogeneity, thus a higher willingness to share opinions and thoughts [42]. All authors participated in developing interview questions. The interview guide format was used for both focus groups and key informant interviews. Grammatical iterative modifications were done to

identify perspectives of maternal social support from the participants, although the general context and format of the questions remained unchanged.

All FGDs were conducted by trained facilitators proficient in English, Arabic, and at least Dinka or Madi. Each FGD was supervised by the researchers (JK and HR). The KIIs were conducted by JK and HR because the participants were proficient in English. In this study, open-ended questions were used for both the FGDs and key informant interviews (for example., *If you had any deep concerns/problems, who would you depend on?*), which was followed up by additional probing questions (for example, *elaborate why? facilitator notes-probe on different problems, not only domestic, child feeding, financial, personal, etc.*). The duration of the FGDs was 180 minutes while KIIs lasted 90 minutes. The participants of the FGDs were provided with a soft beverage (soda) and biscuit during the interview. Additionally, each FGD and KII participant received household utility items as a compensation kit containing a 1kg bar of washing soap, 200 mL of vitamin A fortified cooking oil, and half a kilo each of iodized salt and sugar, all worth about 7,600 Ugx (1.5 USD).

Data analysis

All the FGDs and KIIs were audio-recorded. The recordings in Arabic, Madi, and Dinka were transcribed verbatim by research translators. To minimize bias and increase validity, a multistep approach was used in reviewing the interview transcripts. Two research translators were assigned to simultaneously review the transcripts while listening to the recordings. The transcribed transcripts were back-translated to English by a different research translator for each initial transcription. The audio recordings for the KIIs were transcribed by the researchers (JK, HR, and CW). Any discrepancies in the

transcription were reviewed and discussed by all authors till a consensus was reached. The data were then coded using NVivo v. 12 (QSR International, Melbourne, Australia). The research team reviewed and discussed emerging themes and patterns until a consensus was reached regarding major themes.

Validity and reliability

The interview protocol was reviewed by the research team and supervisors before the study. The participants in the 6 FGDs were randomly selected from the identified refugee settlements to increase sampling diversity and have a broader representation of the findings. This study used open-ended questions with additional follow-up questions to probe the participants till saturation was achieved. The qualitative responses from all participants were triangulated which assisted with convergence, completing of themes, and reduction of discrepancies thus improving the validity of the study [43]. Further, validity and reliability were achieved by having the research team review and discuss the disagreements on codes and themes till a consensus was reached to develop a final code and theme structure.

Ethics

This study was approved by the Institutional Review Boards of the Uganda National Council of Science and Technology (SS 5038), Makerere University School of Health Science Research and Ethics Committee (SHSREC REF:2019-020), and Oklahoma State University (HS-19-2). Additional approval was acquired from the OPM Uganda (OPM/R/107).

Results

Participant characteristics

The results in Table 1 show the main sociodemographic characteristics of the participants. The majority (51.2 %) of all participants were Catholic. Most households were female-headed according to both mothers (86.9 %) and fathers (62.5 %). The majority of mothers (69.6 %) and fathers (54.2 %) reported having no formal employment. The majority (56.6 %) of the mothers had no formal education compared to only a quarter of the fathers. The number of living children reported by both mothers and fathers was between four and five. The fathers had a somewhat higher mean age (Mean SD, 38.8 ± 9.3) compared to the mothers (31.2 ± 6.4).

Barriers to maternal social support in post-emergency settlements

In this study, barriers to maternal social support were presented as three broad themes which included: lack of resources, cultural norms, and spousal consensus on roles (Table 2). In the settlements, refugees are supported to access services by UNHCR and OPM. Mothers, VHTs and KIIs mentioned lack of resources as a key barrier to maternal social support. Most of the KIIs and VHTs also reported that refugees had limited personal resources on their own or within their households as a key hindrance.

“It will not be simple because getting money (for transport), it is not easy.” – Mothers FGD (Boroli)

“Very difficult getting support like money because this one is very difficult to get from others.” – VHT FGD (Boroli)

“Yeah, it's very difficult like if there is any problem. For example, consider a husband and the wife, is having a problem, it will be difficult

for the husband to go to his relative or neighbor to ask him something like money." – KII #4

Under the theme of lack of resources, only the KIIs mentioned the unavailability of resources from other people in the community as a barrier to maternal social support in the post-emergency settlements.

"So, there are so many procedures." – KII #4

"If you have a problem, it is very difficult for you to get support from other people." – KII #5

"It's difficult because everybody thinks that what I have is not even enough for my family." – KII #9

The VHTs and KIIs noted that fathers were not involved in supporting their spouses with household chores and childcare under the cultural norms theme.

"Work (house chores) is supposed to be done by women." – KII #2

"It's not common but it's between you and your wife so you can do it." –

VHT FGD (Boroli)

"The husband of the family to be called the 'husband' should not do such things." – VHT FGD (Boroli)

However, only VHTs mentioned the aspect of indignity while the KIIs specifically alluded to the ethnic traditions as key ideas under culture as a barrier to maternal social support.

"She (the wife) will not allow the husband to do (housework) because that is her work." – VHT FGD (Boroli)

"It is not okay for a husband to enter the kitchen to prepare food, it is a shame for this if the wife is sick there is somebody the wife can call to support them like the neighbor or the oldest child at home." – VHT FGD (Boroli)

"Cultural perspectives, they think that housework things are for women and the cultural for the men they are to provide security for their home, the household chores are for women." – KII #9

"The real work for the wife is to cook for the people, to wash the clothes, to wash the dishes, to look for the firewood somewhere for the feeding of the people. And the husband is going to look for the resources, he can move far and come with it and then hand over to the wife to let the wife to do it for the feedings." – KII #5

Spousal consensus to roles as a gender stereotype was noted as a theme by KIIs as a barrier to maternal social support among refugee post-emergency settlements. In this theme, spousal agreement and the wife being unavailable at a home were emphasized as key barriers.

"If the children are in school, if the wife is not there, the husband has to cook, when they (the children) come from school, then immediately, they get something to eat." – KII #2

"Yes. there is the husband and the wife, and no one around, and the wife gives birth, and no one can give her water or food, the husband can help. It is (the) right (thing to do)." – KII #5

Facilitators of maternal social support within post-emergency settlements

The findings of this study revealed that the facilitators of maternal social support were classified into five broad themes namely, community and culture, physical and tangible support, maternal social support structures, support source when having problems, and postpartum resumption of household duties or chores reported in Table 3. The VHTs and KIIs mentioned under the community and culture theme that it was easy to provide support to mothers in the community, they also mentioned family and leaders as some of the facilitators of maternal social support. Further, neighbors and cultural practices were also identified as facilitators of maternal social support.

"It is very easy." – VHT FGD (Boroli)

"We have (leadership) structures in the community, we have a good number of structures. Sometimes, before someone reaches my office as commander (settlement head), we have cluster leaders, we have block leaders where they can go first" – KII #8

"It is easier for the neighbors (to help), for example, when you (a refugee) has some stress. Like, a child may be hungry, and there is no food; when you go to the neighbors, the neighbor will help you" – KII #2

The majority of the mothers and fathers mentioned diverse ways of physical and tangible support for mothers in the community including support for household chores. Fathers mentioned that they could offer to help out around the house with chores as part of support to their spouses.

"You volunteer yourself and do the family work such as going to collect firewood, fetching water, and sweep the compound." – Fathers FGD (Ayilo)

Also, mothers mentioned as part of tangible support being able to get help with household chores from their friends and neighbors. Also, a few mothers and fathers revealed maternal social support may be manifested in the form of childcare, being able to get financial support, and also solving household conflicts.

"A friend to cook for them (my children) so that they can eat." – Mothers FGD (Nyumanzi)

"And also, if she (mother) has given birth and no one is there to help to bring (fetch) you water for boiling, and some food to eat and other items to your reach. Then your neighbor can help you out in all that if your relationship is all that good. Your neighbor is the one who does the struggling." – Mothers FGD (Boroli)

"When the mother is busy cooking, take the child and silent it (calm the child)." – Fathers FGD (Ayilo)

"Your neighbor can really help in any type of situation, for example, they can separate a fight between a husband and a wife." – Mothers FGD (Nyumanzi)

Additionally, the participants in this study mentioned spousal support and having assistance from neighbors and friends as part of the structures that facilitate maternal social support within the community. Being able to have someone to take care of the baby, and persons able to advise on critical issues around the household were mentioned as support structures.

"You accompany her to the health center, and when you come back home you bring for her one biscuit like this, such (things) will please your wife"
– Fathers FGD (Ayilo)

"Taking care of the mother, if the mother is there, then the husband must support her, the husband who is the head of the family, he can take care of the mother. He can look for the resources so the mother is fed well then the child will also be well." – KII #5

"I can leave my child with my neighbor." – Mothers FGD (Nyumanzi)

"My friends decide to give advice." – Mothers & Fathers FGD (Pagirinya)

Moreover, VHTs, KIIs, and a few fathers identified that mothers were able to rely on other relatives or local organizations within the refugee settlement as support structures. Non-governmental organizations (NGOs) such as Lutheran World Federation (LWF) were relied upon by mothers in addition to having VHTs follow up with the mothers at their homes to check if they and their family members were doing fine.

"When the husband has gone for a long journey (and the wife) give birth shortly, the relative can take care of the baby." – Fathers FGD (Ayilo)

"When the child is born, and the mother is discharged sometimes the VHTs (Village Health Teams) also follow-up with the mother, then if something happens, they'll report." – VHT FGD (Boroli)

"The agencies (partner organizations) support mothers with a new child and even breastfeeding mothers. LWF (NGO) under community services, they (provide) support." – KII #4

Likewise, many participants mentioned that spouses, relatives, neighbors, and friends were some of the people they would be able to go to for support when they had personal or household problems. Further, organizations such as UNHCR and partner agencies were also mentioned as institutions having resources for mothers when troubled with problems. However, a few mothers and fathers explicitly mentioned turning to a deity when having troubles as a source of support.

"If you are at home alone with the child you can leave the child with older children and make (sure) to come back not so late because the child may cry or if you are alone at home, you can put the child down and carry out some other functions." – Mothers FGD (Nyumanzi)

"They (mothers and fathers) are depending on implementing partners; there are several working in settlements, [but the main one is LWF (Lutheran World Federation) which is] doing sector activities, livelihood, community service, psychosocial (support), reforestation, agriculture." – KII #7

"I will not forget my God/God's word so that God will help me. God will make me strong and gives me a good word." – Mothers FGD (Boroli)

"Listening to God's word." - Mothers & Fathers FGD (Pagirinya)

The participants mentioned that for a mother to resume her routine chores postpartum was dependent on many factors that revolved around her health condition during the month after childbirth. Also, maternal social support was dependent on whether the mother had people around her household to help take care of her or the baby when discharged from the health facility. The period that the mother would be afforded to

rest postpartum varied from a day to four months. However, most of the participants revealed that within a week, a mother would resume household chores. A few mothers even revealed that a mother that had childbirth without complications would resume housework that very day, especially if no one was available to help. In contrast, some mothers and fathers reported that a mother would rest for three to four months, although that rest was specific to the mother not traveling long distances but not being excused from household chores.

"Cultures are different. Others may let her be indoors for even close to two weeks. But if the family has no one to help the mother then she can barely spend three days indoors so as to resume her duties." – Fathers FGD (Ayilo)

"Sometimes, it depends on the support of family members. If there are other relatives who are willingly supporting the woman with doing household duties, a mother can stay inside for many days but if there are no other people who can help her, she might stay in the house for only a day and start doing her routine duties so long as she give birth without any problem." – Mothers FGD (Pagirinya)

"A mother (is) supposed to spend three days inside without coming out and 3 months without going for a long distance." – Fathers FGD (Ayilo)

Perceptions of maternal social support in post-emergency settlements

The results in Table 4 showed that the participants had four themes as perceptions of maternal social support which included: social interactions with people in the community, financial support, getting advice and counseling, and mothers feeling some

level of support. Both fathers and mothers mentioned that it was particularly important for mothers to interact socially with other people in the community, however, the majority of the fathers revealed that social interactions by mothers could be a source of insecurities in their relationship as couples.

"I wouldn't bother myself if she talks with her fellow women, but it might be different if it's men. I may have some few questions to ask her about it."

– Fathers FGD (Ayilo)

"Very important." – Mothers & Fathers FGD (Pagirinya)

"The other minor visitations are free for example, like visiting the relatives, there is no problem at all because of the other relatives such as grandmother sisters and so on. We take care of the family since the family is a group of many people." – Fathers FGD (Ayilo)

"Of course, she may have other friends who are important to her in her life, myself as her husband being one of them. She can talk to whoever she wants but I may later know about what they talked about." – Fathers FGD (Ayilo)

"A woman sometimes goes out and visit the neighbor in case some of them are sick and therefore she will not be held accountable for the guilt (of not being there for neighbors) so, it is normal (to interact socially)." – Fathers FGD (Ayilo)

Some mothers and fathers noted that being able to get monetary aid or finances was a form of support that mothers had in the community. Further, the mothers and fathers

mentioned that even accessing money (credit) from the savings done through village savings and loan associations (VLSAs) was part of financial support.

"Get support like money." – Mothers & Fathers FGD (Pagirinya)

"We do savings (of) money." – Mothers & Fathers FGD (Pagirinya)

In addition to sharing information and work such as helping one another with agricultural work in the field, sharing of experiences and ideas to address challenges that mothers may be going through was mentioned by both the mothers and fathers as a key component including the advice and counseling.

"A person can also help by giving you good advice on how to deal with challenges of the day." – Mothers & Fathers FGD (Pagirinya)

"Giving advice or counseling each other is good. When you visit your neighbor at his/her home and counsel them whenever they have a problem, you can ask your neighbor to narrate her/his problems to you (and) then counsel him/her appropriately. You can also support your neighbors or friends." – Mothers & Fathers FGD (Pagirinya)

"Able to share ideas." – Mothers FGD (Boroli)

"Gives me an idea that be patient, those ideas make me learn to be patient till today. If they didn't help me, suppose I would not be alive because of the problems that happen to me." – Mothers FGD (Boroli)

Mothers feeling some level of support was also a theme mentioned by both mothers and fathers. Under this theme, both mothers and fathers verbalized that even though support was provided to mothers, it was inadequate. Also, the mothers at times received support from their children yet the husbands' support with household chores was

mentioned as something of the past. Further, only mothers enunciated that society expected them to take charge of their own needs by supporting themselves in the form of being resilient.

"Support given for us by our families is not enough." – Mothers & Fathers FGD (Pagirinya)

"We cannot see it (the support) currently. We do not have land for agriculture." – Mothers & Fathers FGD (Pagirinya)

"It's the woman that is in charge." – Mothers FGD (Nyumanzi)

"The man is also able to take care (of) it (the baby) sometimes, but the big care is to be done by the mother" – Mothers FGD (Boroli)

"Support in our homes being provided by our children." – Mothers & Fathers FGD (Pagirinya)

"They (husbands) used to support us with fetching water and firewood collection." – Mother and Fathers FGD (Pagirinya)

Discussion

Barriers to maternal social support

The mothers and community leaders mentioned a limitation of personal resources as a key barrier to social support within their households. Interestingly, only KIIs mentioned the rigorous procedures in accessing support from humanitarian partners as a challenge. However, all respondents, except fathers, mentioned not being able to have money to afford services such as the common transport means was a key barrier to accessing support services. Further, even requesting support from other people such as neighbors was stated to be extremely difficult. These findings were consistent with a

qualitative study conducted among Sudanese and Somalian refugees hosted in Canada [8] who reported that lack of accessibility in the form of transport to services areas was a barrier for refugees. Further, refugee parents who had young children in their households experienced more challenges in traveling to services centers or participating in community social protection programs because of a lack of assistance with childcare [44-46].

Even when the refugees receive some transport and childcare allowance, challenges still existed regarding the insufficiency of the funds and finding someone willing to babysit [45]. Also, there is limited sustainability of monetary provision as an intervention, especially with the reducing humanitarian aid among supporting agencies [47, 48] as time passes after the immediate emergency. Therefore, in LMICs, extending services and social protection programs to refugees through community structures and social behavioral change communication (SBCC) approaches such as the use of peer groups may help reduce the resource constraints and increase access to services among refugees in post-emergency settlements [26, 49, 50].

Fathers mentioned that their cultural norms usually discouraged their engagement in household chores as part of physical support for the mothers. Further, VHTs and KIIs elaborated on the social ridicule that is associated with fathers supporting mothers with household chores per the ethnic traditions. These findings were consistent with a qualitative study in Madagascar [51] that reported traditional gender roles associated with home and childcare as a primary responsibility of mothers, often shunned by fathers. In that study, men that supported childcare were also ridiculed in the community. Similarly, studies in Pakistan [52, 53] and Tanzania [54] reported that because women were

subordinate to their male partners, cultural norms imposed that women's roles were limited to roles of taking care of the children and doing house chores in an extended family setting. However, the integration of the women's agenda in community programs while involving fathers too would improve support for mothers while transforming community structures [55]. Also, all gender-inclusive societal programs may systemically address gender-based inequality, inequity, negative social norms, and enhance the recognition of women's value and need for support [56-59].

Only the KIIs reported that limited spousal consensus on roles was a key barrier to maternal social support. Most of the KIIs mentioned that fathers may participate if there was no one else at home to do the house chores or if the wife had just given birth with no relative or friend of the family to support the mother. Similar results were found in rural Pakistan [53] where the division of roles among fathers and mothers was stereotypically predetermined and accepted as the status quo. In that Pakistan study, activities such as providing for the home, playing with the child, protecting the family, and religious teaching were typically reserved for the father while the mother was limited to childcare activities and house chores.

Facilitators of maternal social support

The VHTs and KIIs described that because of community and culture, mothers easily obtained social support. An ethnographic study of Syrian refugees similarly reported strong communal support among refugees because of their ability to mobilize one another into groups to help each other [60]. This kind of maternal support is in line with the support theory [61] which explained that support should be reciprocal. In our study, a few KIIs mentioned the presence of family, leaders, and neighbors, as well as

cultural practices as crucial factors in the provision of support to mothers in the community. They mentioned that South Sudanese refugees experienced a bidirectional form of support where an individual may assist a neighbor with the hope that they would be supported in return in the future. As refugees stay longer within post-emergency settlements, they can find stability in their households and community and may offer one another more practical and emotional support than when they first arrived during an emergency [62].

Both mothers and fathers verbalized physical and tangible support in the form of help with house chores, childcare, financial support, and conflict resolution as facilitators of maternal social support. A pilot study among Ethiopian refugees [46] evaluating health realization showed that refugees ranked support in terms of childcare as the second most important form of social support after access to transportation. Similarly, a social support intervention study among South Sudanese refugees in Canada [45] found that access to childcare and information on services for the resolution of spousal conflicts were important aspects of social support.

The participants also mentioned that maternal social support structures such as spouses, neighbors and friends, other relatives, and local organizations were important components of social support to mothers. Further, in our study, many participants specifically noted that access to support when having a challenge, for example needing someone to provide financial support, was a major facilitator of maternal social support. Also, our data indicated that support when having challenges was provided through close relatives, neighbors and friends, community institutions, and local leaders. These results were in line with findings from a qualitative study of Sudanese and Yemeni refugees in

Jordan [19] that reported social support among refugees was acquired through a dense social network of persons. In that study, social networks were explained as ties close to an individual such as family, neighbors, and persons defined by the same ethnicity or nationality who helped one another with non-financial issues, childcare, and working towards improved health.

Likewise, a cross-sectional study of Sri Lankan refugees [63] resettled in Canada reported the importance of family in facilitating support in the form of improved mental health to the Tamil refugees. In that study, separation from family was associated with an increased likelihood of severe psychological problems. Our findings identified both distal and proximal facets of social support for refugee mothers in post-emergency settlements. Social support enabled information provision, affirmation in challenging situations, and provision of practical aid and understanding of situations delivered through interactions between individuals with peers, friends, family, and professionals [64]. Even though refugees may have limited ability to support each other financially during the earlier periods of emergency [60], engagement in livelihoods programs such as VSLAs over time enabled supporting each other through fiscal challenges.

In our study, many mothers and fathers mentioned that time off from household chores postpartum was an important aspect of maternal social support. The period before the resumption of work postpartum is also known as maternity leave (ML). ML has largely been associated with formal employment with only limited consideration of purposeful rest for mothers in the informal sector postpartum [65]. In our study, there were large variations in the periods that the participants reported a mother should take off work in the household or the community. The variations in the restful period for mothers

postpartum depended on priorities around a household, condition of delivery, and the availability of other people to help. These conditions were similar to mothers engaged in formal work environments [66]. While no study to our knowledge has examined the effects of ML on the health and wellbeing of a mother or child in low-income countries, multi-study reviews in middle and high-income countries [67, 68] reported a positive association between ML and infant breastfeeding length. In those studies, longer maternal rest postpartum was beneficial for both the mother and child.

The United Nations International Labor Organization (ILO) recognizes ML as a strategy for maternal social protection for improved maternal and child health [65, 69]. Further, maternal social protection interventions and strategies such as ML, cash transfers, counseling and education, and the baby-friendly hospital initiatives (BFHI) improved both maternal and child health [70-72]. Even though some strategic programs are directed towards support for mothers with infants, especially in LMICs and underserved communities, increasing interventions with maternal social support are beneficial to the mother and child. Recent studies showed [56, 57, 59, 73, 74] that indirect health-focused interventions with social support reduced stress on the mother, improved both the mother and infant health, and perhaps extend a restful period during the postpartum period.

Perceptions of maternal social support

Many mothers and fathers extolled that engaging in social interactions in the community was fundamental for maternal social support. However, some fathers hinted those social interactions by mothers with males who were not family may lead to domestic insecurities due to suspicions of infidelity. A study of South Sudanese refugees

in northern Uganda [6] also highlighted social interaction as the main factor for both local and transnational movements among the refugees. In that study, social interactions among refugees, and also between refugees and host communities, were attributed to services acquired or provided by refugees such as selling or purchase of agricultural produce. A Canadian study on the settlement of Syrian refugees [11] reported that refugees emphasized the importance of interactions with neighbors, friends, and social gatherings as a means of integration into the community [75]. Also, a study on social networks of Sudanese and Yemeni refugees hosted in Jordan [19] reported that intracommunity interactions were important in helping refugees mobilize one another and share information related to their social welfare or community development passed on through community channels. Social interactions play an important role in building social cohesion, sharing experiences, and learning from one another [36, 76-78]. Emphasizing the importance of such community relations and networks is important in implementing SBCC programs as indirect strategies for improving the health, nutrition, and livelihoods of vulnerable communities [20, 26, 79-81].

A few mothers and fathers mentioned the role of financial support as part of maternal social support. Funds received through various socioeconomic livelihoods, aid, and savings were considered fundamental to mothers. These responses were consistent with a study on social support needs for Sudanese and Somali refugees in Canada [8] that reported the need for finances as a key form of support. However, low household finances and reliable income flow were attributed to unstable employment. A qualitative study on refugees in Jordan [19] and a mixed-methods study of South Sudanese refugees in Uganda [82] revealed that strengthening relations, especially among women, was

achieved through borrowing money in form of small loans through VSLAs and renting of property from neighbors, friends, or other community members. Refugees hosted in Uganda have limited restrictions on settling in urban areas or towns which may provide more livelihood opportunities through engaging in varied socioeconomic ventures. However, in Uganda, settlement registration to receive aid is available only to areas provided for refugees to stay which are mainly rural [6].

Interestingly, in our study, seeking advice and counseling in form of sharing information, how to perform tasks, and sharing experiences and ideas were only mentioned by mothers and fathers but not the KIIs and VHTs. The participants verbalized that obtaining advice supported in relieving stress and increasing knowledge, and the roles of advisor were interchangeable among peers depending on the circumstances one was going through. Our findings were consistent with previous reports among South Sudanese refugees [83, 84]. Social networks assist in seeking advice within the community to help resolve conflicts and other challenges among refugees. Further, a qualitative study on Sudanese refugees in Australia [85] reported that due to the variety of needs of refugees, there was a need to converse with both professionals and fellow community members as part of developing strategies for dealing with distress and social isolation. Interventions seeking to increase maternal social support, and improve maternal and infant nutrition may consider the value of social group interventions [36].

Mothers feeling some level of support was mentioned by a few fathers and mothers as one of the ways to achieve maternal social support. Providing social support is important in helping with physical tasks and reducing the sense of isolation [86]. Refugees assisting each other enables them to identify ways to deal with challenges

through household and community support and with limited reliance on humanitarian aid [36, 82]. However, in our study, the general opinion of some of the mothers and fathers was that mothers did not feel understood nor supported enough. Some participants verbalized that the mothers were resilient enough to support themselves. A qualitative study in Southern Tanzania [54] likewise explained that even though men could assist women with household chores such as washing dirty laundry, women were left to do all the work themselves because men doing such work was not congruent with societal norms. A previous study in Tanzania [87] elaborated on the neglect of roles for women mentioning that even when women stepped up to engage in other extra roles predominantly reserved for men, such as income generation in a household, men do not reciprocate by increasing involvement in house and childcare. The extra roles taken up by women increased a self-created responsibility burden, and the mothers who felt resilient did not seek out social support to ease their responsibilities. These findings indicated the need for gender-inclusive social support interventions to increase social responsibility towards each other as well as additional support by males on household chores for mothers to feel more supported.

This study provided a critical examination of maternal social support in post-emergency settlements. Our findings were similar to reports within rural communities in LMICs and within refugee communities in high-income countries. However, this is the first study to our knowledge to examine barriers, facilitators, and perceptions of maternal social support among South Sudanese refugees in post-emergency settlements in Uganda. One of the strengths of our study was that the data were collected from multiple participants including mothers, fathers, VHTs, and KIIs. This improved the triangulation

of the findings among the groups of participants. However, because the study was conducted among South Sudanese refugees in the Adjumani district in the West-Nile region, the results may only be generalizable to this region. Refugees in other areas may face different challenges because of the heterogeneity of local contexts and conditions.

Conclusion

This study examined the experiences of maternal social support in post-emergency settlements in the West-Nile Region in Uganda. Implementing programs that are gender-inclusive and target societal and cultural stereotypes may improve barriers, perceptions, and facilitators of maternal social support. Using a multisectoral approach in these programs may be beneficial for improved maternal social support. Such interventions with a social support component engaging both males and females could serve as indirect strategies to address livelihoods, food security, women's empowerment, education, and other socio-economic activities that would contribute to maternal and child health and nutrition. Overall, there is an opportunity through SBCC to improve programs and policies in post-emergency settlements.

Based on this study, we recommend that humanitarian agencies and partners aiming to improve maternal and child health and nutrition of refugees in post-emergency increase SBCC approaches targeting barriers, facilitators, and perceptions of maternal social support; especially for health and nutrition-focused interventions. Social support interventions may impact the behavior and attitudes of communities toward self-reliance by minimizing dependence on humanitarian aid. Further research is needed to assess the experiences of social support of other caretakers such as grandparents, and older relatives within households having children under five years of age in post-emergency settlements.

Tables

Table 1: Sociodemographic characteristics of the respondents (n=47)

Variables	Mothers		Fathers		Total	
	n	%	n	%	n	%
Respondent gender	23	48.9	24	51.1	47	100
Religion						
Catholic	13	56.5	11	45.8	24	51.2
Anglican	10	43.5	8	33.3	18	38.4
SDA	.	.	2	8.3	2	4.2
Other Christian	.	.	3	12.4	3	6.2
Ethnicity						
Dinka	8	34.8	12	50.0	20	42.4
Madi	8	34.8	12	50.0	20	42.4
Acholi	2	4.4	.	.	2	2.2
Other	6	26.0	.	.	6	13
Household head						
Husband	3	13.1	9	37.5	12	25.3
Wife	20	86.9	15	62.5	35	74.7
Length of stay in post-emergency						
2 years	2	8.7	1	4.2	3	6.5
3 years	7	30.4	9	37.5	16	34.0
4 years	3	13.0	2	8.3	5	10.7
5 years or more	11	47.8	12	50.0	23	48.8
Occupation						
Stay home spouse	16	69.6	13	54.2	29	61.8
Farmer	6	26.1	8	33.3	14	29.8
Other	1	4.3	3	12.5	4	8.5
Education level						
No formal educ	13	56.6	6	25	19	40.5
Primary	10	43.4	15	62.5	25	53.2
Secondary & higher	.	.	3	12.5	3	6.3
Number of living children [†]	4.5	±1.9	5.2	±3.2	4.9	±2.7
Moms Age at first birth [†]	19.2	±3.92	.	.		
Moms current age [†]	31.2	±6.46	.	.		
Family size [†]	9.2	±4.1	8.3	±3.3	8.72	±3.7
Dads current age [†]	.	.	38.8	±9.34		

[†]Respondent mean score and standard deviation; One participant in the moms-only focus groups did not complete the quantitative questionnaire after the focus group session.

Table 2: Barriers to maternal social support among refugees in post-emergency settlements in the West-Nile region in Uganda

Theme	Codes	Quotations	Data Source (#times mentioned)
Lack of resources	Limited personal resources	<p>“No money.” – Mothers FGD (Boroli)</p> <p>“ It will not be simple because getting money (for transport), it is not easy.” – Mothers FGD (Boroli)</p> <p>“Very difficult getting support like money because this one is very difficult to get from others.” – VHT FGD (Boroli)</p> <p>“It is not easy for the mother, it is hard, it is a bit hard to get help for the mother” – KII #5</p> <p>“Yeah, It's very difficult like if there is any problem. For example, consider a husband and the wife, is having a problem, it will be difficult for the husband to go to his relative or neighbor to ask him something like money.” – KII #4</p>	<p>Mothers FGD (2)</p> <p>VHT FGD (3)</p> <p>KII (8)</p>

	No resources from others	<p>"So, there are so many procedures." – KII #4</p> <p>"If you have a problem, it is very difficult for you to get support from other people." – KII #5</p> <p>"The community is lacking of resources." – KII #5</p> <p>"It's difficult because everybody thinks that what I have is not even enough for my family." – KII #9</p> <p>"It's a bit very difficult to get things for us (as refugees), it's a bit very difficult." – KII #3</p>	KII (9)
Cultural norms	Fathers not involved in household chores and childcare	<p>"They (fathers) are not doing (helping with household chores)." – VHT FGD (Boroli)</p> <p>"Not fully (helping with household chores)." – KII #9</p> <p>"Work (house chores) is supposed to be done by women." – KII #2</p> <p>"It's not common but it's between you and your wife so you can do it." – VHT FGD (Boroli)</p> <p>"The husband of the family to be called the 'husband' should not do such things." – VHT FGD (Boroli)</p>	VHT FGD (6) KII (8) VHT FGD (2)
	Indignity	<p>"She (the wife) will not allow the husband to do (housework) because that is her work." – VHT FGD (Boroli)</p> <p>"It is not okay for a husband to enter the kitchen to prepare food it is a shame for this if the wife is sick</p>	VHT FGD (6)

		there is somebody the wife can call to support them like the neighbor or the oldest child at home." – VHT FGD (Boroli)	
	Ethnic traditions	<p>"Cultural perspectives, they think that housework things are for women and the culture for the men they are to provide security for their home, the household chores are for women." – KII #9</p> <p>"The real work for the wife is to cook for the people, to wash the clothes, to wash the dishes, to look for the firewood somewhere for the feeding of the people. And the husband is going to look for the resources, he can move far and come with it and then hand over to the wife to let the wife to do it for the feedings." – KII #5</p> <p>"They are soldiers, men are to defend the family." – KII #7</p>	KIIs (14)
Spousal consensus on roles	Spousal agreement	<p>"We (fathers and mothers) share things like even cooking, if there is no one (else) at home, you have to cook." – KII #2</p> <p>"They (the fathers) can participate, they can clean." – KII #5</p>	KIIs (9)
	Wife unavailable at home	" If the children are in school, if the wife is not there, the husband has to cook, when they (the children) come from school, then immediately, they get something to eat." – KII #2	KIIs (5)

		" Yes. there is the husband and the wife, and no one around, and the wife gives birth, and no one can give her water or food, the husband can help. It is (the) right (thing to do)." – KII #5	
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Table 3: Facilitators of maternal social support among refugees in post-emergency settlements in the West-Nile region in Uganda

Theme	Codes	Quotations	Data Source (#times mentioned)
Community and culture	Easy to provide support	"It is very easy." – VHT FGD (Boroli) "Parents get support" – KII #1 "You may get (help), sometimes" – KII #3	VHT FGD (2) KIIs (8)
	Family and leaders	"We have (leadership)structures in the community, we have a good number of structures. Sometimes, before someone reaches my office as commander (settlement head), we have cluster leaders, we have block leaders where they can go first" – KII #8	KIIs (2)
	Having neighbors	"It is easier for the neighbors (to help), for example, when you (a refugee) has some stress. Like, a child may be hungry, and there is no food; when you go to the neighbors, the neighbor will help you" – KII #2 "So, I told a friend, the neighbor that I am coming back (home shortly). So, the person can watch my family, if the children are out playing" – KII #4	KIIs (2)
	Cultural practices	"Is a common practice because where we are and the culture, we have it" – KII #2 "In the clans, when they have problems, they gather in those clans" – KII #7	KIIs (3)
Physical and tangible support	Supporting with Household chores	"You volunteer yourself and do the family work such as going to collect firewood, fetching water, and sweep the compound." – Fathers FGD (Ayilo) "A friend to cook for them (my children) so that they can eat." – Mothers FGD (Nyumanzi) "And also, if she (mother) has given birth and no one is there to help to bring (fetch) you water for boiling, and some food to eat and other items to your reach. Then your	Fathers FGD (4) Mothers FGD (4)

		neighbor can help you out in all that, if your relationship is all that good. Your neighbor is the one who does the struggling." – Mothers FGD (Boroli)	
	Childcare	"Checking in on how the baby is fairing." – Mothers FGD (Nyumanzi) "When the mother is busy cooking, take the child and silent it." – Fathers FGD (Ayilo)	Mothers FGD (1) Fathers FGD (1)
	Financial support	"Give her what will make her happy such as money." – Fathers FGD (Ayilo) "(Getting) some money." – Mothers FGD (Boroli)	Fathers FGD (1) Mothers FGD (3)
	Help to solve conflicts	"Your neighbor can really help in any type of situation, for example, they can separate a fight between a husband and a wife." – Mothers FGD (Nyumanzi)	Mothers FGD (2)
Maternal social support structures	Husband (Spouse) support	"Is the father of the baby who cares for both the mother and the baby." – Fathers FGD (Ayilo) "The major thing is communicating to her (the wife) in a lovely way" – Fathers FGD (Ayilo) "You accompany her to the health center, and when you come back home you bring for her one biscuit like this, such (things) will please your wife" – Fathers FGD (Ayilo) "It is the responsibility of the father to take care of both the children and the mother." – Mothers & Fathers FGD (Pagirinya) "The man(Husband) is also able to take care of it (the baby) sometimes, but the big care is to be done by the mother." – Mothers FGD (Boroli)	Fathers FGD (8) Mothers & Fathers FGD (3) Mothers FGD (3) VHT FGD (2) KIIs (7)

	<p>"Taking care of the mother, if the mother is there, then the husband must support her, the husband who is the head of the family, he can take care of the mother. He can look for the resources so the mother is fed well then the child will also be well." – KII #5</p> <p>"It is usually by the head of the household, the husband's partners (relatives) only come in to support you where somebody is more vulnerable like I am the husband of a woman, and I am not around, and the woman cannot get any support from the family members." – KII #8</p>	
Neighbors and friends assistance	<p>"Neighbors." – Fathers FGD (Ayilo)</p> <p>"The neighbors. Because our way of setting the settlements are close to each other, we give them plots of 30 x 30, so everywhere you see a neighbor is nearby you." – KII #7</p> <p>"I can leave my child with my neighbor." – Mothers FGD (Nyumanzi)</p> <p>"My friends decide to give advice." – Mothers & Fathers FGD (Pagirinya)</p>	<p>Fathers FGD (1)</p> <p>VHT FGD (3)</p> <p>KIIs (2)</p> <p>Mothers FGD (1)</p> <p>Mothers & Fathers FGD (7)</p>
Other relatives support	<p>"When the husband has gone for a long journey (and the wife) give birth shortly, the relative can take care of the baby." – Fathers FGD (Ayilo)</p> <p>"It is in most cases mother from the husband's side (Grandmother)." – KII #2</p> <p>"Usually, it's the mother's big girls (daughters), they are the ones." – KII #8</p>	<p>Fathers FGD (1)</p> <p>VHT FGD (4)</p> <p>KIIs (9)</p>
Local organization/institution	<p>"When the child is born, and the mother is discharged sometimes the VHTs (Village Health Teams) also follow-up with the mother, then if something happens, they'll report." – VHT FGD (Boroli)</p> <p>"The agencies (partner organizations) support mothers with a new child and even breastfeeding mothers. LWF (NGO) under community services, they support." – KII #4</p>	<p>VHT FGD (1)</p> <p>KIIs (1)</p>

Support source when having problems	Husband and relatives	<p>"It's your Husband and others that stay with you that can help in case of emergency." – Mothers FGD (Nyumanzi)</p> <p>"If I have a problem, I usually go to any of my relatives and get helped if possible." – Mothers & Fathers FGD (Pagirinya)</p> <p>"If you are at home alone with the child you can leave the child with older children and make (sure) to come back not so late because the child may cry or if you are alone at home, you can put the child down and carry out some other functions." – Mothers FGD (Nyumanzi)</p> <p>"Members of the family." – VHT FGD (Boroli)</p>	<p>Mothers & Fathers FGD (6)</p> <p>Mothers FGD (4)</p> <p>VHT FGD (3)</p> <p>KIIs (4)</p>
	Neighbors and friends	<p>"I have to go to my nearest neighbor who could help from that problem." – Mothers & Fathers FGD (Pagirinya)</p> <p>"If there is a financial problem with my husband and I as a woman cannot disturb my husband because I know very well (that) he might not have money we can decide together to borrow a loan from either our neighbor or from the group association." – Mothers & Fathers FGD (Pagirinya)</p> <p>"It's your neighbor first before the whole community gets informed." – Mothers FGD (Nyumanzi)</p> <p>"First is neighbors, after that if the neighbor will not solve the issue, the person can go for further help (to other people) if they can't solve the issue." – VHT FGD (Boroli)</p> <p>"You go and consult the neighbor; you talk with them if you have some type of problem if the neighbor has something they assist." – VHT FGD (Boroli)</p>	<p>Mothers & Fathers FGD (5)</p> <p>Mothers FGD (6)</p> <p>VHT FGD (6)</p> <p>KIIs (2)</p>

	Local organizations/ institutions	"UNHCR (United Nations High Commissioner for Refugees)." – Mothers & Fathers FGD (Pagirinya) "They (mothers and fathers) are depending on implementing partners there are several working in settlements, [but the main one is LWF (Lutheran World Federation) which is] doing sector activities, livelihood, community service, psychosocial, reforestation, agriculture." – KII #7	Mothers & Fathers FGD (3) KIIs (18)
	Local leaders	"They go to the RWC(Refugee Welfare Committee)." – VHT FGD (Boroli)	VHT FGD (5)
	Spiritual support	"I will not forget my God/God's word, so that God will help me God will make me strong and gives me a good word." – Mothers FGD (Boroli) "Listening to God's word." – Mothers & Fathers FGD (Pagirinya)	Mothers FGD (1) Mothers & Fathers FGD (1)
Postpartum resumption of household duties	About a month	"Cultures are different. Others may let her be indoors for even close to two weeks. But if the family has no one to help the mother then she can barely spend three days indoors so as to resume her duties." – Fathers FGD (Ayilo) "Sometimes, it depends on the support of family members. If there are other relatives who are willingly supporting the woman with doing household duty, a mother can stay inside for many days but if there are no other people who can help her, she might stay in the house for only a day and start doing her routine duty so long she give birth without any problem." – Mothers FGD (Pagirinya)	Fathers FGD (5) Mothers FGD (4)
	About a week	"A mother supposed to spend three days inside without coming out and 3 months without going for a long distance." – Fathers FGD (Ayilo) "Four days." – Mothers FGD (Pagirinya)	Fathers FGD (3) Mothers & Fathers FGD (2)
	A day	"Even a mother can start doing her normal work on the same day if there is nobody to help her and she has birth safely without any problem." – Mothers FGD (Pagirinya)	Mothers FGD (2)

		"If there are no other people who can help her, she might stay in the house for only a day." – Mothers FGD (Pagirinya)	
	3 months and more	"Three to four months." – Mothers & Fathers FGD (Pagirinya) "I can stay for three months without going anywhere." – Mothers FGD (Nyumanzi)	Mothers & Fathers FGD (2) Mothers FGD (1)

Table 4: Perceptions of maternal social support among refugees in post-emergency settlements in the West-Nile region in Uganda

Theme	Codes	Quotations	Data Source (#times mentioned)
Social interactions	Important for mothers to interact socially	<p>"Of course, she may have other friends who are important to her in her life, myself as her husband being one of them. She can talk to whoever she wants but I may later know about what they talked about." – Fathers FGD (Ayilo)</p> <p>"If she goes to visit like the brother-in-law or sister-in-law, then I won't have an issue." – Fathers FGD (Ayilo)</p> <p>"When your wife goes out visiting under your permission, you don't feel bad about it. You know very well nothing will happen and you also need to set the rules guiding the visitation." – Fathers FGD (Ayilo)</p> <p>"The other minor visitations are free for example, like visiting the relatives there is no problem at all because the other relatives such as grandmother sisters and so on. We take care of the family since the family is a group of many people." – Fathers FGD (Ayilo)</p> <p>"A woman sometimes goes out and visit the neighbor in case some of them are sick and therefore she will not be held accountable for the guilt (of not being there for neighbors) so, it is normal (to interact socially)." – Fathers FGD (Ayilo)</p> <p>"Very important." – Mothers & Fathers FGD (Pagirinya)</p>	<p>Fathers FGD (7)</p> <p>Mothers & Fathers FGD (5)</p> <p>Mothers FGD (3)</p>
	Source of Social insecurities	<p>"I wouldn't bother myself if she talks with her fellow women, but it might be different if it's men. I may some few questions to ask her about it." – Fathers FGD (Ayilo)</p>	<p>Fathers FGD (5)</p>
Financial support	Monetary aid	<p>"Get support like money." – Mothers & Fathers FGD (Pagirinya)</p> <p>"We do saving (of) money." – Mothers & Fathers FGD (Pagirinya)</p>	<p>Mothers & Fathers FGD (2)</p>
Advice and counseling	Sharing information and work	<p>"Doing agriculture work if available." – Mothers & Fathers FGD (Pagirinya)</p> <p>"Relieves off your stress." – Mothers & Fathers FGD (Pagirinya)</p> <p>"A person can also help by giving you good advice on how to deal with challenges of the day." – Mothers & Fathers FGD (Pagirinya)</p> <p>"Giving advice or counseling each other is good. When you visit your neighbor at his/her home and counsel them whenever they have a problem, you can ask your neighbor to narrate her/his problems to you and then counsel him/her appropriately.</p>	<p>Mothers & Fathers FGD (6)</p> <p>Mothers FGD (2)</p>

		<p>You can also support your neighbors or friends." – Mothers & Fathers FGD (Pagirinya)</p> <p>"Get more knowledge." – Mothers & Fathers FGD (Pagirinya)</p> <p>"Have good information that can make you have a peace at your home with your kids together." – Mothers FGD (Boroli)</p>	
	Share experiences & ideas	<p>"Able to share ideas." – Mothers FGD (Boroli)</p> <p>"Gives me an idea that be patient, those ideas makes me learn to be patient till today. If they didn't help me, suppose I would not be alive because of the problems that happen to me." – Mothers FGD (Boroli)</p> <p>"Will tell you the goodness of having neighbors." – Mothers FGD (Boroli)</p>	Mothers FGD (5)
Mothers feeling some level of support	Do not feel understood and supported enough	<p>"Support given for us by our families are not enough." – Mothers & Fathers FGD (Pagirinya)</p> <p>"We cannot see it (the support) currently. We do not have land for agriculture." – Mothers & Fathers FGD (Pagirinya)</p>	Mothers & Fathers FGD (4)
	Maternal resilience	<p>"Many people say that it is us (women)." – Mothers FGD (Nyumanzi)</p> <p>"It's the woman that is in charge." – Mothers FGD (Nyumanzi)</p> <p>"The man is also able to take care it take care sometimes, but the big care is to be done by the mother" – Mothers FGD (Boroli)</p>	Mothers & Fathers FGD (2) Mothers FGD (4)
	Being somehow understood and supported by family and friends	<p>"Support in our homes being provided by our children." – Mothers & Fathers FGD (Pagirinya)</p> <p>"They (husbands) used to support us with fetching water and firewood collection." – Mother and Fathers FGD (Pagirinya)</p>	Mothers & Fathers FGD (2)

Table 5: Guides for focus group discussions and key informant interviews

Mother focus group discussions

1. Who takes care of a mother and the newborn baby after she has given birth?
 - a). How long after childbirth does the mother stay at home with the child?
 - b). Why?
 2. Is it important to you to be able to interact with friends, family, or other groups of people?
 - a). Why?
 3. Are there things your family or friends do or could do for you to make you feel that they are important or useful to your life? Give some examples.
 4. If you had any deep concerns/problems, who would you depend on?
 - a). Elaborate why? (Probe different problems, not only domestic but financial, personal, etc.)
 5. If you wanted to meet or visit other people, are you able to do that easily?
 - a). If not, what would make it difficult to do so?
 6. Do you feel that you are understood by friends and family?
 - a). How important is that to you (the mother) that you are understood?
-

Father focus group discussions

1. Who takes care of a mother and the newborn baby after the mother has given birth?
 2. How long after childbirth does the mother stay at home with the child?
 3. What do you usually do for your wife to make her feel that you are important or useful to her life?
 4. How do you feel about your wife meeting or visiting other people?
 5. Do you think it is important for your wife to interact with friends, family, or other groups of people?
 6. How would you feel about your wife sharing any deep concerns/problems with other trusted people?
 - a). Elaborate why?
-

Mother and father focus group discussions

1. Who takes care of a mother and the newborn baby after she has given birth?
 - a). Why?
 2. How long after childbirth does the mother stay at home with the child?
 3. If you had any deep concerns/problems, who would you depend on?
 - a). Elaborate why? (Probe different problems, not only domestic but financial, personal, etc.)
 4. Do you feel you are understood and supported by your family and friends?
 - a). Why or why not?
 5. Is it important for you to feel understood/supported?
-

6. Is it important to you to be able to interact with friends, family, or other groups of people?

a). Why?

7. Are there things your family or friends do that make you (the mother) feel that you (the mother) are important to them?

a). Give some examples.

Key informant and VHTs

1. If mothers had deep concerns or problems, who would they depend on or go to for help?

2. In your community, what are infants fed immediately after birth?

a). Who feeds infants immediately after birth?

b). Is this a common practice?

3. Who takes care of the mother and the newborn baby after childbirth?

4. Is it easy or difficult for mothers to get support/assistance from other people in the community? (probe for financial, social, childcare, etc.)

a). Why?

5. Do fathers in your community get engaged in household chores and child feeding? (probe to other forms of directly supporting the mother)

a). Why or why not?

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CHAPTER V

A PEER-LED INTEGRATED NUTRITION EDUCATION INTERVENTION THROUGH CARE GROUPS IMPROVED COMPLEMENTARY FEEDING OF INFANTS IN POST-EMERGENCY SETTLEMENTS IN THE WEST-NILE REGION IN UGANDA

Abstract

Complementary feeding of infants in refugee settlements remains inadequate, amidst declining humanitarian aid. However, there is limited evidence for interventions to address these nutrition challenges in the refugee settlements. This study examined the effects of a peer-led integrated nutrition education intervention on infant feeding by South Sudanese refugee mothers in the West-Nile region in Uganda.

A community-based randomized controlled study enrolled 390 pregnant women (3rd trimester) as the baseline. Two arms (Moms-only and Moms & Dads combined) comprised treatments with a Control arm. The Medical Outcomes Study (MOS) social support index was used to measure maternal social support. An overall mean score of > 4 was considered optimal social support, with a score of ≤ 2 as none or little support. Infant complementary feeding was assessed using WHO and UNICEF guidelines. Data was

collected at Midline-II and Endline. Multivariable logistic regression models determined the effects of the intervention over time on the complementary feeding practices. The models were adjusted for potential confounders.

At the end of the study period, the complementary feeding of infants improved significantly in both treatment arms. There was a positive effect on the introduction of solid, semi-solid or soft foods (ISSSF) in the Moms-only arm at both Midline-II (AOR=4.0) and Endline (AOR=3.8). Likewise, ISSSF was better for the Moms & Dads arms at both Midline-II (AOR=4.5) and Endline (AOR = 3.4) periods. Minimum dietary diversity was significantly better at the Endline only for the Moms & Dads' arm (AOR=3.0). Minimum acceptable diet (MAD) was significantly better at Endline only for both Moms-only (AOR=2.3) and Moms & Dads' arms (AOR=2.7). Infant consumption of eggs and flesh foods (EFF) was improved only in the Moms & Dads arm at both Midline-II (AOR=3.3) and Endline (AOR = 2.4) periods. Higher maternal social support was associated with better infant MDD (AOR=3.3), MAD (AOR=3.6), and EFF (AOR=4.7).

Engaging both fathers and mothers in Care Groups provided better complementary feeding of infants. Overall, this peer-led integrated nutrition education intervention through Care Groups improved the complementary feeding of infants in the post-emergency settlements in the West-Nile region of Uganda

Introduction

The United Nations High Commissioner for Refugees (UNHCR) in 2020 reported the highest ever displacement of persons at 82.4 million [1, 2]. The majority (86 %) of refugee crises occurred in low-and-middle-income countries (LMICs) with 44.5 percent of the refugees within Africa [3]. Uganda was ranked third (jointly with Pakistan) among countries hosting refugees. The majority (62 %) of the refugees hosted in Uganda, came from South Sudan due to the prolonged civil unrest [4]. The United Nations (UN) through its agencies, partner organizations, and the host country provide for the needs of the refugees including health, nutrition, and food security. Yet, as humanitarian aid is reduced after the emergency period [5, 6], inadequate feeding practices and child undernutrition remain a primary health concern of refugees in protracted situations [7, 8].

Optimal child feeding practices are critical in preventing undernutrition [9-11]. However, poor complementary feeding practices were reported in the West Nile post-emergency settlements in Uganda in 2020 [12]. Such suboptimal infant feeding practices are associated with an increased risk of undernutrition, disease, and mortality [13]. Hence, providing an integrated nutrition education intervention through maternal peer support may positively influence caregivers in adhering to feeding practices, thus improving child nutrition [10, 14-17]. Nutrition-specific interventions grounded in a social behavior change communication (SBCC) approach such as the Care Group model [18-24] may provide sustainable, cost-effective strategies to improve child feeding practices and reduce malnutrition [25, 26].

Understanding the role of such nutrition interventions delivered through maternal peer support on complementary feeding practices of infants may influence the implementation

of sustainable programs on child nutrition in post-emergency settlements. Yet, evidence of the effectiveness of such nutrition strategies remains limited [27]. Systematic reviews of health in humanitarian crises [5, 28] indicated that few studies had been done to assess the efficacy of indirect nutrition focused interventions on infant and young child feeding (IYCF) practices. Therefore, this study aimed to examine 1) the effect of a peer-led integrated nutrition education intervention delivered through Care Groups on complementary feeding practices of infants among refugees in the West-Nile region in Uganda, and 2) the relation among the Care Group intervention, maternal social support, and complementary feeding of infants. To our knowledge, this is the first study to investigate the impact of a peer-led integrated nutrition education intervention using the Care Group model on IYCF practices among infants in post-emergency settlements in Uganda. Further, this study uses the most recent World Health Organization (WHO) and United Nations Children's Fund (UNICEF) IYCF guidelines [29] which have not yet been widely used to investigate child feeding practices within post-emergency refugee settlements. Post-emergency settlements are defined as protracted politically stable environments in which the UNHCR and refugee host country continually provide for the well-being of refugees beyond the first two years of emergency [30, 31]. The findings in this study may be used to design nutrition-sensitive programs and also inform policies targeting complementary feeding practices within post-emergency settlements in Uganda.

Methods

Study setting

A community-based cluster randomized controlled trial was conducted among refugee post-emergency settlements in the West Nile region in Uganda. The Adjumani

district was randomly selected among the 10 districts hosting refugees in the region. Four of 19 settlements in the Adjumani district were randomly selected and assigned to three arms of the study. Each study arm had a total of ten groups. Ayilo-I settlement was assigned as a Moms-only treatment arm, Pagirinya and Ayilo II settlements were the Mom & dads treatment arm while Nyumanzi settlement was the control arm. These settlements were at least 6 kilometers apart to reduce the possibility of spillover effects of the intervention. The village health team (VHT) members and health center midwife assistants supported the identification of pregnant mothers to be included in the study.

Sample size

Introduction of complementary foods as recommended was used as the primary outcome because of its reliability as an indicator of child feeding practices. A desired sample size of 317 women was calculated using GPower 3.1 software, a type I error of 0.05, a power of 0.90, and an effect size of 0.2 [14, 17] to detect differences in the proportions of infants introduced to complementary foods at 6-8 months among the 3 study arms. A 23 percent loss during follow-up was estimated; thus, 390 women (15-49 years of age) in their third trimester of pregnancy comprised the study sample and were enrolled at baseline. Husbands were eligible to participate with their wives in the Moms & Dads treatment arm. Eighty-two percent (321) of the mother-infant dyads completed the study.

Inclusion and exclusion criteria

Mothers whose antenatal records showed pregnancy complications were excluded from the study. Mothers who gave birth to premature infants, with congenital

abnormalities, or whose infants died had the option of remaining in the study but were excluded from the final analyses.

Intervention

A peer-led integrated nutrition education program was delivered using the Care Group model to the treatment arms. Ten Groups each with 10 – 20 participants were the Care Groups or peer-groups assigned in each of the two treatments. In one treatment arm, Moms-only participated in the intervention while the other had a combination of Moms & Dads in the Care Groups. Through the Care Group model, peer leaders that served as community-based health and nutrition educators facilitated the trainings, peer supervision, and support of one another in the peer groups [22, 32-34]. The intervention consisted of peer-led training on group dynamics, infant feeding guidelines [35], cooking demonstrations, and backyard farming demonstrations conducted over 10 months. The peer-led trainings lasted 60 – 90 minutes and were conducted every two weeks. All study arms were expected to receive the standard of care which was the follow-up of mothers and their infant through the government health services system. Each of the study arms had a total of 10 groups. The study began in January 2020 and was completed in December 2020.

Measures

The independent variables for this study included the study arms, time, and maternal social support scores. All participants in the study were assigned by settlement to one of the three study arms, Moms-only, Moms & Dads combined, and the Control. Complementary feeding practices of infants were assessed at the Midline-II and Endline study periods. However, maternal, household and other infant characteristics were

collected during the four different study periods as illustrated in the study Gantt chart (Figure 1S).

Maternal social support was assessed with the medical outcomes study (MOS) social support scale [36]. A set of 19 questions (Table 1S) with a five-point Likert scale was adapted from the MOS scale which has often been used in assessing social support. Recent studies in Uganda [37] and Zimbabwe [19] also adapted the MOS questions to assess maternal social support among local communities. In this study, participants expressed the level of perceived support with responses ranging from “*none of the time*” (score of ‘1’) to “*all of the time*” (score of ‘5’). The mother’s perceived social support based on their total mean score was categorized into optimal (>4 and ≤ 5); moderate (>3 and ≤ 4), low (>2 and ≤ 3), and none or very low support (≤ 2) [36].

Dependent Variables

Infant complementary feeding practices

The dependent variables in this study were practices of complementary feeding as defined by the WHO IYCF Indicators [29]. These variables (defined in Table 2S) included the timely introduction of solid and semi-solid foods (ISSSF) to infants, minimum dietary diversity (MDD), minimum meal frequency (MMF), minimum acceptable diet (MAD), and consumption of eggs and or flesh foods (EFF). These complementary feeding practices assessed at both the Midline-II and Endline periods determined whether the infant “*met*” or “*did not meet*” the feeding practice.

Statistical analyses

Descriptive statistics for household, infant, and maternal characteristics, and practices of complementary feeding of infants were compiled. Differences in proportions of descriptive characteristics among the study arms' were tested using chi-square and ANOVA. Bivariate logistic regression was used to examine the effects of the Care Group intervention on the complementary feeding of infants. Associations with $p < 0.1$ were included in the multivariable logistic regression models.

Confounding variables

This study controlled for potential confounders frequently reported as determinants of complementary feeding practices for infants [38-41]. The confounding maternal variables included the mother's current age, body mass index, who supports the mother most, number of living children, and religion; household confounders included household food insecurity access scale (HFIAS) scores, family size, household head, ethnicity and years spent in refugee settlement, while infant confounders included birth weight and sex.

Exploratory analyses were performed to evaluate multicollinearity of the explanatory variables. The variance inflation factor (VIF) (<10) and the tolerance test (<0.2) were within acceptable limits. In this study, outcome variables that maintained a p -value < 0.05 in the multivariable analyses were considered significant. Data analyses were performed using STATA/ SE v17.0 (Stata Corp LLC, Lakeway Drive, TX, USA).

Ethical approval

This study was approved by the Institutional Review Boards of the Uganda National Council of Science and Technology (SS 5038), Makerere University School of

Health Science Research and Ethics Committee (SHSREC REF:2019-020), and Oklahoma State University (HS-19-2). Additional permission was acquired from the Office of the Prime Minister (OPM) Uganda (OPM/R/107). Informed consent was obtained from all respondents at recruitment for participation in the study, and before data collection during the study. At each data collection period, the participants were provided with a 1kg bar of washing soap, 200mL of vitamin A fortified cooking oil, and half a kilo each of iodized salt and sugar, all worth 7,600 Uganda shillings (1.5 USD) as compensation for participation in the study.

Results

Sociodemographic characteristics of the participants

Descriptive statistics included percentages and means of household, infant, and maternal characteristics reported in Table 1. The proportion of households headed by the mother in all study arms ranged from 46.5 percent to 58.8 percent. The mean \pm SD for family size for all study arms was about eight people (8.3 ± 3.1). Based on the wealth index [42], less than half of the households in all arms were identified as poor, however, the Moms & Dads study arm had the lowest proportion (25.2%) of poor households compared to the control (47.2%) and Moms-only (47.9%). Further, the highest mean household food insecurity access scale (HFIAS) score was reported in the control arm (10.2 ± 5.3). The mothers in the control had stayed in the refugee settlements for a mean of five years. The highest proportions of male infants (62.4%) were observed in the Moms & Dads treatment arm compared to the Moms-only arm (48.4%) and the control (43.4%). The overall mean infant birth weight was 3.1 ± 0.5 kg.

More than half of the mothers in the Moms & Dads treatment arm (59.8%) had an education of upper primary or higher, compared to the Moms-only (31.3%) and the control (33.3%) study arms. The majority of all respondents were stay-home spouses. The Dinka were the most prevalent ethnic group (65.0%) among all participants in the study. Additionally, most of the mothers in the control arm (71.8%) and the Moms-only arm (71.5%) were of the Anglican religion compared to the 24.5 percent in the Moms & Dads study arm.

Most mothers ($\geq 91.9\%$) in all study arms delivered at a health facility with skilled care. Also, more than three-quarters ($\geq 77.8\%$) of the mothers did not meet the WHO recommendations of a minimum of eight antenatal visits before infant delivery. Similarly, less than 25.2 percent of mothers in all study arms attended the recommended minimum four postnatal care visits within the first six weeks after giving birth.

Maternal social support

Results in Table 2a showed that overall, spouses were the mothers' best source of social support in all study arms during these two study periods when children began receiving complementary feeding. Further, mothers in the Moms & Dads study arm had the highest spousal support at both the Midline-II (51.2%) and Endline (61.3%) periods. However, the mothers in the Moms & Dads arm had the highest proportion of moderate to high social support at both Midline-II (84.3%) and the Endline period (94.6%). The lowest proportion of moderate to high social support was among the mothers in the control arm for both Midline-II (19.6%) and Endline (6.8%) periods. Furthermore, results in Table 2b indicated that there were significant differences in the mean social support scores among the three study arms at Midline-II ($F_{(2, 335)} = 92.8, p < 0.001$) and at

Endline ($F_{(2, 315)} = 539.5, p < 0.001$). The results in Table 2c showed that mothers in the Moms & Dads treatment arm had higher means social support scores than the Moms-only arm at both Midline-II (mean difference (MD) = 10.3, $p < 0.001$) and Endline ($MD = 27.7, p < 0.001$). Similarly, the Moms & Dads treatment arm had higher social support scores than the control at Midline-II and the Endline periods ($MD = 25.2, p < 0.001$, and $MD = 44.0, p < 0.001$, respectively). The Moms-only treatment arm also had better maternal social support scores than the control at both Midline-II ($MD = 15.0, p < 0.001$) and the Endline period ($MD = 16.3, p < 0.001$).

Complementary feeding practices of infants

The complementary feeding practices (IYCF) of mothers in the Adjumani district post-emergency settlements are reported in Table 3. Most ($\geq 87.4\%$) of the refugee mothers in the treatment arms (Moms-only and Moms & Dads) introduced their infants to solid and semi-solid foods (ISSSF) in the 6–8 mo. age period. In contrast, less than two-thirds of mothers in the control arm (66.2% at Midline-II and 65.6% at endline) did ISSSF between 6 – 8 months of age. By the end of the study, less than half of infants (age range 6-11 months) in all study arms met the minimum dietary diversity (MDD). In the Moms & Dads treatment arm 47 percent of infants were reported to have consumed at least five of eight food groups, followed by infants in the Moms-only (34.0%) and Control (24.1%) arms. By the end of the study, more than 81.8 percent of infants in all study arms met the minimum meal frequency (MMF).

Also, by the end of the study, more than one-third ($\geq 38.0\%$) of the infants in the treatment arms met the MAD compared to infants in the Control arm (24.1%). By the end

of the study, the highest proportion of infants that consumed eggs and or flesh foods (EFF) was in the Moms & Dads treatment arm (33.0%), followed by the Moms-only arm (29.0%) and the Control arm (18.2%) but these results were not significantly different ($p = .055$). However, significantly more infants in the Moms & Dads study arm had begun EFF consumption (26.9%) by Midline II, while EFF consumption among infants was low in the Moms-only (12.2%) and Control (8.5%) arms.

Effect of the Care Group intervention on complementary feeding of infants

Significant associations were observed between mothers' involvement in the Care Groups and the complementary feeding practices of infants (Table 4 and Figure 2S).

Introduction to solid and semi-solid or soft foods (ISSSF)

There were significant associations between the study intervention and ISSSF among mothers in the Adjumani post-emergency settlements (Table 4). Infants of mothers in the Moms-only treatment arm were more likely to receive ISSSF at both the Midline-II (AOR = 4.7, 95% CI: 1.47, 10.69, $p = 0.007$) and the Endline (AOR = 3.8, 95% CI: 1.41, 10.34, $p = 0.008$) study periods compared to the Control arm. Similarly, infants in the Moms & Dads treatment arm were more likely to receive ISSSF at both the Midline-II (AOR = 4.5, 95% CI: 1.46, 14.13, $p = 0.009$) and Endline (AOR = 3.4, 95% CI: 1.01, 11.33, $p = 0.048$). This study also showed that infants of mothers in the Care Groups were associated with better infant ISSSF than the infants in the Control arm.

Infant minimum dietary diversity (MDD)

A significant association between participation in the Moms & Dads treatment arm and infant MDD was reported by the end of the study (Table 4). Infant minimum dietary diversity (MDD) was better for infants in the Moms & Dads arm (AOR = 3.0, 95% CI: 1.33, 6.64, $p = 0.014$) when compared to the Control arm.

Infant minimum meal frequency (MMF)

Infants in the Moms & Dads treatment arm were more likely to have met MMF at the Midline-II (AOR = 3.4, 95% CI: 1.14, 10.10, $p = 0.028$) but were not significantly better than the Control arm at the end of the study. Furthermore, infants in the Moms-only arm showed significantly improved odds of meeting MMF at Midline-II (AOR = 2.7, 95% CI: 1.03, 7.23, $p = 0.043$) and only marginally improved by Endline (AOR = 2.7, 95% CI: 0.99, 7.28, $p = 0.055$) when compared to the Control.

Infant minimum acceptable diet (MAD)

Significant associations between infant MAD and parent participation in the Care Group intervention were observed by the end of our study. Infants of mothers who participated in either the Moms-only (AOR = 2.3, 95% CI: 1.13, 4.63, $p = 0.021$) or Moms & Dads (AOR = 2.7, 95% CI: 1.20, 6.00, $p = 0.016$) treatment arms were more likely to have met MAD compared to the Control.

Infant consumption of eggs and or flesh foods (EFF)

Our findings showed that infants whose parents were in the Moms & Dads treatment arm were more likely to consume EFF at both Midline-II (AOR = 3.3, 95% CI: 1.03, 10.36, $p = 0.036$) and the Endline (AOR = 2.4, 95% CI: 1.01, 5.14, $p = 0.031$)

periods when compared to the Control arm. The infants in the Moms-only arm showed marginal improvements in consumption of EFF by the end of the study (AOR = 2.1, 95% CI: 0.99, 4.50, $p = 0.055$), however, the likelihood was not statistically significant compared with the Control arm

In summary, over the study period, participation in the Care Group intervention had a higher likelihood of better complementary feeding of infants than mothers in the Control arm. By the end of the study, mothers in both treatment arms had significantly better infant ISSF and MAD. Infant MDD and EFF were only significantly improved in the Moms & Dads treatment arm. There were no significant differences in infant MMF between mothers that participated in the Care Group intervention and the Control arms by the end of the study.

Maternal social support and complementary feeding of infants

Associations between complementary feeding indicators and extent of maternal social support were not significant during the Midline-II period. However, by the Endline period, infants of mothers with higher social support were more likely to have met the MDD, MAD, and EFF. Mothers with optimal social support had infants that were three times more likely to meet MDD (AOR = 3.3, 95% CI: 1.02, 10.63, $p = 0.046$) and MAD (AOR = 3.6, 95% CI: 1.12, 11.69, $p = 0.032$), and more than four times more likely to feed eggs or flesh food to their infant (AOR = 4.7, 95% CI: 1.18, 18.87, $p = 0.028$) in the Adjumani district post-emergency settlements.

Discussion

To our knowledge, this was the first randomized controlled trial to examine the effects of a peer-led integrated nutrition education intervention using the Care Group model on complementary feeding practices of infants among refugee settlements in Uganda. We hypothesized that 1) maternal participation in the Care Group intervention would improve infant complementary feeding practices of refugee infants, and 2) the Care Group intervention would improve maternal social support concerning complementary feeding of infants.

In our study, the Care Group model supported peer-to-peer nutritional training on the complementary feeding of infants using visual aids with key messages [35]. Short questions included in each module facilitated discussion among members and promoted dialogue and understanding of concepts of recommended practices in the treatment arms. Further, activities such as backyard gardening of vegetables and cooking demonstrations in the Care Groups encouraged more nutrient-dense recipes for infants. Also, the peer-to-peer home visits, and peer support emphasized accountability on feeding and infant care practices within Care Groups [43].

This study demonstrated that mothers who participated in the Care Group interventions were more likely to receive ISSSF for their infants compared to mothers in the Control arm over the study period. A study from Malawi [44] likewise highlighted the value of improving food preparation demonstrations using local staples as a means for mothers to taste and examine the consistency of appropriate foods for infants. Further, building the capacity of mothers improved the timing of ISSSF, as well as quality of

infant food. Our findings also were in line with a systematic review of multiple trials [14] on complementary feeding which reported that nutrition education interventions reduced the practice of untimely ISSSF in infants thus improving infant feeding practices. Additionally, caretakers learning and observing peers performing desired behaviors normalized the behavior and enhanced diffusion of practices of improved preparation of infant complementary foods to maximize nutrient retention for the child's growth and development [45]. Our findings emphasize the importance of the Care Group intervention among post-emergency refugee communities as a caregiver-centered behavior change communication strategy for timely infant ISSSF.

By study's end, infants of mothers in the Care Group intervention had significantly better minimum dietary diversity compared to those in the Control. Randomized control trials from Kenya [17] and Uganda [46] likewise reported that caretakers who participated in integrated nutrition training provided their children (6 – 48 months of age) with more food groups including flesh foods and vegetables compared to the those in the control groups. The training modules in our intervention on healthy nutrition emphasized eating a variety of foods categorized under proteins, vitamins, minerals, and carbohydrate-rich foods demonstrated under the 'grow' 'glow' and 'go' food themes for easier comprehension among the caretakers. Similar to our intervention, a joint program evaluation in Bangladesh, Malawi, Peru, and Zambia [47] and a study from Malawi [44] reported that mothers groups were effective in improving dietary quality and quantity due to participatory nutritional counseling and simultaneous cooking demonstrations.

Our Care Group cooking demonstrations showed participants options for nutritious meals for infants, such as a sorghum or millet porridge blended with peanut paste on an egg. Such a combination would provide carbohydrates, protein, lipids, and important micronutrients beneficial for infant growth while using locally available foods [48]. Likewise, studies in Ethiopia [49, 50] demonstrated that mothers who participated in SBCC interventions such as meal preparation demonstrations had children with better MDD compared to children of caretakers in the Control arm. Our findings provide additional evidence for the impact of the Care Group model as an integrative SBCC approach in improving the consumption of a variety of food groups among infants at six months and beyond. The lack of significance at the Midline-II yet better MDD observed at the Endline period may be explained by the need for a relatively longer period for the Care Group intervention to positively influence the MDD practices of infants and young children. The time variability of ISSSF for infants even within the 6-8 months age period recommended by WHO and UNICEF guidelines [29] may have affected the infant's consumption of different types of foods.

In this study, significant positive effects of the Care Group intervention on infant MMF were observed only at Midline-II in the Moms & Dads treatment. The Moms-only treatment arm showed marginal improvement in infant MMF over the study periods. Our significant findings were consistent with a recent systematic review [51] and a meta-analysis [52] of peer group nutrition interventions that reported an increase in the likelihood of MMF. Child-caregiver engagement in a cooking demonstration together with educational counseling created lasting changes in child feeding practices concerning the frequency of meals. Additionally, studies in Ethiopia [53-55] and rural China [56]

showed that caregivers with increased exposure to social behavioral change communication (SBCC) through nutrition messages had two or more times the odds of meeting infant MMF compared to the control group.

Despite the COVID-19 pandemic, our findings revealed that by the end of our study, both treatment arms had significantly better infant minimum acceptable diet (MAD) when compared to the Control arm. Our findings were consistent with studies in Ethiopia [53] and Kenya [17] which reported significantly better MAD, MDD, and MMF among children whose caretakers participated in complementary feeding behavior change communication interventions. In our Care Group intervention, in addition to peer-led dialogue, we considered the combination of the value of local foods together with the cooking demonstrations providing a better understanding of both optimal quality and quantities of meals thus improving the MAD among infants in the intervention groups. The nutrition training and food demonstrations had pictorial illustrations of nutritious foods and care which were informative to the participants during the Care Group meeting and the peer-to-peer home visits and required limited literacy to conceptualize.

In our study, egg and flesh foods consumption was low over the two time periods. A randomized control trial in Western Uganda [46] attributed the low consumption of eggs and flesh foods to the high cost of these foods. Further, based on data from eleven countries, Headey, Hirvonen (57) explained that the limited availability of eggs and their low shelf-life factors that reduced purchase and consumption of EFF by infants. However, by the end of our study, infants of mothers in the Care Group interventions were two times more likely to consume EFF when compared to the Control arm. Our

findings also were consistent with studies in Kenya [17, 58] which emphasized the importance of integrated education, nutrition, and agricultural programs in addressing barriers like myths related to delayed speech and prohibitive notions to the consumption of eggs and flesh foods. Based on our findings we suggest that programs targeting the improvement of EFF in post-emergency settlements should consider integrating nutrition-sensitive agricultural activities such as poultry rearing to increase sources of EFF. For example, recent studies in Ghana [59] and Ethiopia [60, 61] showed that providing mothers with local chickens to rear in addition to nutritional education training [62] increased infant consumption of eggs.

The greater positive effect of the Care Group intervention on the complementary feeding of infants by the end of our study suggested that the intervention may be beneficial within the refugee context. The marginal improvements especially in the Moms-only treatment emphasize that the behavioral change approach among communities requires adherence to the treatment over a longer time for the desired change to take effect [63] and provide even significantly better infant practices. The infants in the Care Groups in our study had better complementary feeding practices compared to those in the Control. These results were consistent with the findings of a comparative analysis study of five countries in Africa and Asia [20] which determined that countries that implemented the Care Group model through organizations had a better infant and young child complementary feeding. Also, by the end of our study period, the Moms & Dads treatment arm showed a more positive likelihood of meeting complementary feeding practices indicating that fathers in the Care Group intervention provided additional support and motivation to mothers assisting in childcare.

Our findings were consistent with previous community-based studies [64-66] which reported that targeting fathers in behavior change nutrition programs increased the participation of fathers in child feeding and participation in household chores beyond the traditional role of provision of food for the household. Based on our findings, future nutrition-sensitive programs should consider more Care Groups with both Moms & Dads for even better maternal social support and practices of complementary feeding of infants. For example, in an Alive and Thrive technical brief [48], the barrier of adult males being prioritized for meats and flesh foods with infants left to be fed energy-dense porridges was reported as a barrier in developing strategies for adequate complementary infant feeding. Therefore, engaging fathers in the Care Groups and similar social behavioral change interventions may impact child feeding practices.

This study reported that the mothers in the Care Group intervention had higher maternal social support compared to the Control arm. Further, the Moms & Dads treatment arm had significantly better mean social support scores compared to the Moms-only and Control arms. The higher social support scores in this study may be explained by increased peer and spousal support encouraged by the Care Group intervention in both treatment arms. In our Care Group intervention, the role of fathers in infant feeding and childcare practices was emphasized through visual aids and key messages. Our findings were supported by a qualitative study in Tanzania [66] which noted that fathers who received nutrition counseling improved spousal communication and engagement in household chores including feeding the children. Our study findings also revealed that the mothers that had higher social support scores were more likely to have infants that met MDD, MMF, and MAD. These findings were in line with a study in Zimbabwe [19]

which reported that children of mothers with greater social support were more likely to achieve MDD. Additionally, a quasi-experimental study in western Kenya [58] showed that social support to mothers by fathers and grandmothers improved infants' MMF and MDD, although a lack of significant association with the infants' MAD was attributed to other food insecurity factors.

A cross-sectional study in Uganda [37], likewise reported that increased maternal social support was positively associated with infant MMF, and MAD. The findings in our study indicated that the mothers in the Moms & Dads intervention arm had higher social support and better complementary feeding practices for their infants. Also, our findings agreed with results from studies in Kenya [67, 68] which reported that fathers who participated in peer dialogues on nutrition-sensitive topics through intervention programs experienced positive complementary practices of behavioral change. The behavioral transformation among fathers led to increased acquisition and provision of nutritionally diverse diets to their children evidenced by both improved MDD and MAD. Fathers' involvement in participating in nutrition-sensitive farming like backyard vegetable growing or practices like keeping chicken for eggs or prioritization of flesh foods for children's meals improved complementary feeding of infants.

Our study provided evidence for the positive effects of a peer-led integrated nutrition-sensitive intervention using Care Groups on improved infant feeding practices within refugee communities. Further, this study's findings inform that agencies supporting refugees in post-emergencies should consider engaging more fathers and other

caretakers within the household in the Care Group intervention to increase maternal social support and even better complementary feeding practices for infants.

One limitation to our study was that the safety operating procedures implemented to combat the spread of COVID-19 beginning in March 2020 [69] may have mitigated the potential of the Care Group model, a strategy built on enhanced peer support. In response to the Covid-19 threat, preventive measures and IYCF recommendations for when COVID-19 is confirmed or suspected [35] were integrated into the Care Group activities. Although no participants or research team members reported contracting COVID-19, we acknowledge the effects that smaller peer support groups and contact may have had [70]. Nevertheless, the findings in this study were consistent with previous literature on randomized control trials conducted in rural community settings. Another limitation was the assessment of infant feeding practices based on the caregiver's 24-hour memory that may be affected by recall bias among the respondents. Further, the assessment of perceived maternal social support may have been influenced by social desirability bias for example mothers overstating or understating their perceived support.

A strength of our study was the use of the randomized control study design which allowed establishment of a causal association between the Care Group intervention and complementary feeding practices of infants. Further, the training of the Care Group leaders and routine monitoring of the activities of the Care Groups by the VHTs that worked with the researcher and district health and nutrition educators was a key strength in the effectiveness and sustainability of the intervention.

Conclusion

A peer-led integrated nutrition education intervention through Care Groups improved complementary feeding practices of infants in post-emergency settlements in Uganda. Our study illustrated that engaging fathers in the Care Group intervention had stronger effects on complementary feeding of infants than the intervention targeting moms alone, even though improvements in infant feeding practices were observed in both treatments. Humanitarian partners and refugee host countries may find integrative nutrition-focused programming using indirect strategies such as the Care Groups to be a cost-effective, sustainable approach for the improvement of infant feeding practices among post-emergency settlements in similar local contexts.

Tables

Table 1: Sociodemographic characteristics of the respondents

Variable	Control Arm	Moms-only Arm	Moms & Dads Arm	Total	Sig. [†]
	Mean ± SD or % (n)	Mean ± SD or % (n)	Mean ± SD or % (n)	Mean ± SD or % (n)	
Family head					
Mother	57.3 (67)	58.8 (77)	46.5 (66)	53.9 (210)	0.028
Father	27.4 (32)	19.1 (25)	35.9 (51)	27.7 (108)	
Other relative	15.4 (18)	22.1 (29)	17.6 (25)	18.5 (72)	
Family size [†]	8.59 ± 3.63	8.38 ± 3.07	7.97 ± 3.36	8.30 ± 3.31	0.316
Wealth index ¹					
Poor and below	47.2 (42)	47.9 (57)	25.2 (28)	39.8 (127)	<0.001
Middle	27.0 (24)	25.2 (30)	13.5 (15)	21.6 (69)	
Wealthy and above	25.8 (23)	26.9 (32)	61.2 (68)	38.6 (123)	
HFIAS [†]	10.2 ± 5.3	9.7 ± 6.0	8.0 ± 5.2	9.0 ± 5.7	0.011
Years living in refugee area [†]	5.1 ± 1.8	4.8 ± 1.8	4.1 ± 1.3	4.7 ± 1.7	<0.001
Infant sex					
Male	43.4 (43)	48.4 (61)	62.4 (83)	52.2 (187)	0.009
Infant birthweight ^{1†}	3.0 ± 0.4	3.0 ± 0.5	3.2 ± 0.5	3.1 ± 0.5	<0.001
Maternal education					
No formal education	49.6 (58)	45.8 (60)	18.3 (26)	36.9 (144)	<0.001
Lower primary	17.1 (20)	22.9 (30)	21.8 (31)	20.8 (81)	
Upper primary	26.5 (31)	26.7 (35)	38 (54)	30.8 (120)	
Secondary and higher	6.8 (8)	4.6 (6)	21.8 (31)	11.5 (45)	
Ethnicity					
Dinka	96.0 (95)	88.8 (111)	16.1 (20)	65.0 (226)	<0.001
Madi	3.0 (3)	11.2 (14)	66.9 (83)	28.7 (100)	
Other	1.0 (1)	0.0 (0)	16.9 (21)	6.3 (22)	
Religion					
Catholic	2.6 (3)	16.8 (22)	50.6 (72)	24.9 (97)	<0.001
Anglican	71.8 (84)	71.0 (93)	24.7 (35)	54.4 (212)	

Other	25.6 (30)	12.2 (16)	24.7 (35)	20.8 (81)	
Infant delivery place¹					
Local health center	68.7 (68)	78.6 (99)	70.5 (93)	72.8 (260)	0.022
Private HC	2.0 (2)	0.8 (1)	0.8 (1)	1.1 (4)	
Hospital	21.2 (21)	19.8 (25)	28.0 (37)	23.2 (83)	
Home & other area	8.1 (8)	0.8 (1)	0.8 (1)	2.8 (10)	
ANC¹					
Optimal	23.2 (23)	22.2 (28)	14.8 (20)	19.7 (71)	0.190
PNC¹					
Optimal	21.2 (21)	22.2 (28)	25.2 (34)	23.1 (83)	0.747

¹ Variables collected at midline-1 after the infant was born; ² variables collected at Endline; HFIAS- Household Food Insecurity Access Scale; ANC antenatal care visits (\geq routine 8 visits to a health center during pregnancy; PNC postnatal care visits (\geq routine 4 visits in < 6 weeks after birth); World Health Organization; † Mean scores and standard deviations respectively; ‡ Study arm means differences performed with ANOVA; †† Proportion differences among study arms tested using chi-square.

Table 2a: Maternal social support characteristics

Variables	Midline II				Endline			
	C	M	M&D	Total	C	M	M&D	Total
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Support the mother most								
Husband	35.9 (33)	45.6 (57)	51.2 (62)	45.0 (152)	52.2 (46)	40.3 (48)	61.3 (68)	50.9 (162)
Peers or Neighbors	16.3 (15)	13.6 (17)	16.5 (20)	15.4 (52)	11.4 (10)	10.9 (13)	8.1 (9)	10.1 (32)
Other relative	34.8 (32)	25.6 (32)	23.1 (28)	27.2 (92)	21.6 (19)	30.3 (36)	21.6 (24)	24.8 (79)
Other	1.0 (1)	2.4 (3)	0.9 (1)	1.5 (5)	6.8 (6)	4.2 (5)	4.5 (5)	5.0 (16)
No one	12.0 (11)	12.8 (16)	8.3 (10)	10.9 (37)	8.0 (7)	14.3 (17)	4.5 (5)	9.2 (29)
Maternal Social support¹								
Very low or none	6.5 (6)	1.6 (2)	1.7 (2)	3.0 (10)	17.0 (15)	5.0 (6)	1.8 (2)	7.2 (23)
Low	73.9 (68)	36.0 (45)	14.0 (17)	38.5 (130)	76.1 (67)	33.6 (40)	3.6 (4)	34.9 (111)
Moderate	17.4 (16)	54.4 (68)	49.6 (60)	42.6 (144)	4.5 (4)	49.6 (59)	21.6 (24)	27.4 (87)
Optimal/high	2.2 (2)	8.0 (10)	34.7 (42)	16.0 (54)	2.3 (2)	11.8 (14)	73.0 (81)	30.5 (97)
Total social support score (%)								
Mean, SD	38.6 ± 9.7	53.5 ± 14.8	63.8 ± 14.3	53.2 ± 13.0	34.6 ± 9.5	51.0 ± 11.8	78.7 ± 6.7	56.0 ± 9.3

¹Maternal perceived social support mean score categorized into optimal (>4 and ≤5); moderate (>3 and ≤4), low (>2 and ≤3), and none or very low support (≤2) Sherbourne and Stewart (1991); C – control, M- Moms-only, M&D-Moms & Dads study arms

Table 2b: Maternal social support among study arms in Adjumani post-emergency settlements

Study arm	Midline-II						Endline					
	N	Mean	S.D (±)	S. E	F	p-value	N	Mean	S.D (±)	S. E	F	p-value
Control	92	38.5	9.7	1.0	92.79	< 0.001	88	34.6	9.4	1.0	539.5	< 0.001
Moms-only	125	53.5	14.8	1.3			119	51.0	11.8	1.1	119	
Moms & Dads	121	63.8	14.3	1.3			111	78.7	6.7	0.6	111	

SD-standard deviation; S. E- standard error;

Table 2c: Pairwise comparisons of maternal social support and intervention arms in Adjumani post-emergency settlements

(I) Study arms	(J) Study arms	Midline-II		Endline	
		MD (I-J)	S.E	MD (I-J)	S.E
Moms-only	Control	15.0***	1.9	16.3***	1.3
	Moms & Dads	-10.3***	1.7	-27.7***	1.3
Moms & Dads	Control	25.2***	1.9	44.0***	1.4
	Moms-only	10.3***	1.7	27.7***	1.3

MD-mean difference; Tukey HSD correction applied for unequal sample sizes; * $p < .05$, ** $p < .01$, *** $p < .001$; S.E – standard error

Table 3: Infant complementary feeding in the Adjumani post-emergency settlements

Infant Complementary feeding indicators	Midline-II period				Endline period			
	C	M	M&D	Sig [‡]	C	M	M&D	Sig [‡]
	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	
Introduction of solid, semi-solid or soft foods (ISSSF) [§]								
No	33.8 (23)	12.0 (9)	12.6 (11)	0.001	34.4 (22)	11.1 (9)	11.5 (10)	<0.001
Yes	66.2 (45)	88.0 (66)	87.4 (76)		65.6 (42)	88.9 (72)	88.5 (77)	
Minimum ≥5 of 8 food groups (MDD) [‡]								
Did not Meet	87.3 (62)	81.1 (60)	71.0 (66)	0.037	75.9 (66)	66.0 (66)	52.8 (56)	0.004
Met	12.7 (9)	18.9 (14)	29.0 (27)		24.1 (21)	34.0 (34)	47.2 (50)	
Minimum meal frequency (MMF) [‡]								
Did not Meet	25.4 (18)	14.9 (11)	14.0 (13)	0.125	18.2 (16)	12.1 (12)	13.3 (14)	0.464
Met	74.6 (53)	85.1 (63)	86.0 (80)		81.8 (72)	87.9 (87)	86.7 (91)	
Minimum acceptable diet (MAD) [‡]								
Did not Meet	87.3 (62)	83.8 (62)	74.2 (69)	0.081	75.9 (66)	62.0 (62)	57.5 (61)	0.025
Met	12.7 (9)	16.2 (12)	25.8 (24)		24.1 (21)	38.0 (38)	42.5 (45)	
Egg and/or flesh food consumption (EFF) [‡]								
No	91.5 (65)	87.8 (65)	73.1 (68)	0.004	81.8 (72)	71.0 (71)	67.0 (71)	0.055
Yes	8.5 (6)	12.2 (9)	26.9 (25)		18.2 (16)	29.0 (29)	33.0 (35)	

C -Control study arm; M-Moms only study arm; M&D – Moms & Dads study arm; [‡]Chi-square test for differences in proportions of feeding practices among groups within the study period

[§] calculated for children between 6-8 months; [‡] calculated for infants 6 – 23 months

Table 4: Association between infant complementary feeding practices and the Care Group intervention

	Midline-II Period	Endline period
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	Unadjusted		Adjusted		Unadjusted		Adjusted	
	OR (95% CI)	<i>p</i> -value	AOR [‡] (95% CI)	<i>p</i> -value	OR (95% CI)	<i>p</i> -value	AOR [‡] (95% CI)	<i>p</i> -value
Introduction of solid, semi-solid, or soft foods (ISSSF)								
Moms-only	3.7 (1.59, 8.85)	0.003	4.0 (1.47, 10.69)	0.007	4.2 (1.77, 9.94)	0.001	3.8 (1.41, 10.34)	0.008
Moms & Dads	3.1 (1.57, 7.92)	0.002	4.5 (1.46, 14.13)	0.009	4.0 (1.75, 9.31)	0.001	3.4 (1.01, 11.33)	0.048
Minimum Dietary Diversity (MDD)								
Moms-only	1.6 (0.65, 3.99)	0.306	1.6 (0.56, 4.34)	0.330	1.6 (0.85, 3.08)	0.141	1.8 (0.89, 3.70)	0.099
Moms & Dads	2.8 (1.22, 6.46)	0.014	1.6 (0.53, 4.90)	0.387	2.8 (1.5, 5.23)	0.001	3.0 (1.33, 6.64)	0.014
Minimum meal frequency (MMF)								
Moms-only	1.9 (0.84, 4.48)	0.118	2.7 (1.03, 7.23)	0.043	1.6 (0.72, 3.63)	0.246	2.7 (0.99, 7.28)	0.055
Moms & Dads	2.1 (0.95, 4.62)	0.069	3.4 (1.14, 10.10)	0.028	1.4 (0.66, 3.15)	0.356	2.3 (0.77, 7.18)	0.134
Minimum acceptable diet (MAD)								
Moms-only	1.3 (0.52, 3.39)	0.546	1.1 (0.40, 3.25)	0.845	1.9 (1.02, 3.64)	0.043	2.3 (1.13, 4.63)	0.021
Moms & Dads	2.4 (1.04, 5.55)	0.041	1.4 (0.43, 4.37)	0.586	2.3 (1.24, 4.33)	0.008	2.7 (1.20, 6.00)	0.016
Egg and/or flesh food consumption (EFF)								
Moms-only	1.5 (0.50, 4.46)	0.723	1.3 (0.34, 4.42)	0.532	1.8 (0.92, 3.67)	0.085	2.1 (0.99, 4.50)	0.055
Moms & Dads	4.0 (1.53, 10.34)	0.043	3.3 (1.03, 10.36)	0.036	2.2 (1.12, 4.36)	0.021	2.4 (1.01, 5.14)	0.031

[‡]Results adjusted for the household head, food insecurity, wealth index, years spent in refugee settlement, maternal education, who support the mother most, ethnicity, body mass index, religion, child sex, birthweight
OR-crude odds ratios, AOR-adjusted odds ratios

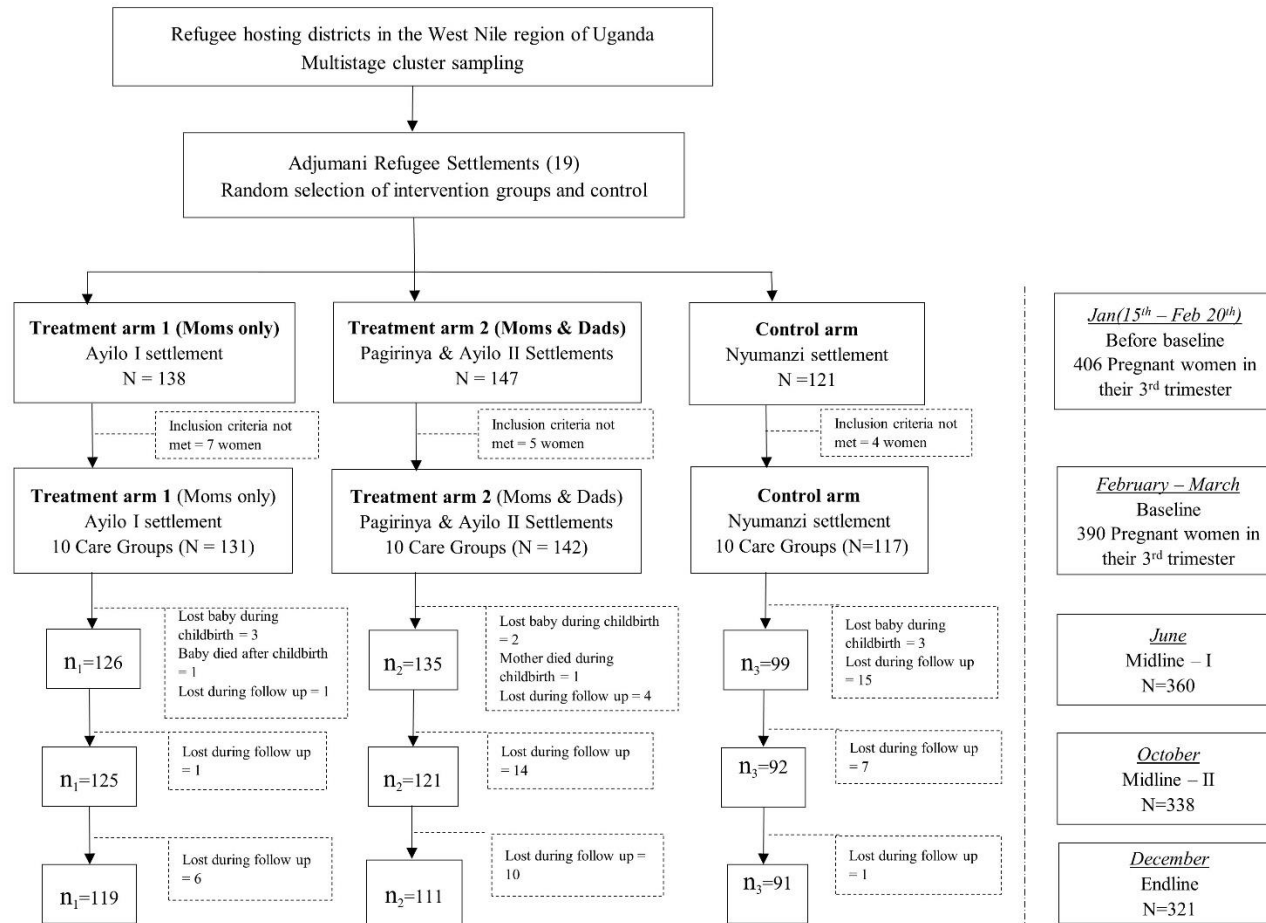
Table 5: Association of maternal social support on complementary feeding of infants

	Midline-II Period				Endline period			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	OR (95% CI)	<i>p</i> -value	AOR [‡] (95% CI)	<i>p</i> -value	OR (95% CI)	<i>p</i> -value	AOR [‡] (95% CI)	<i>p</i> -value
ISSSF								
Low social support	1.9 (0.42, 8.79)	0.392	1.3 (0.19, 8.39)	0.677	1.1 (0.31, 3.69)	0.919	1.0 (0.27, 3.49)	0.962
Moderate social support	3.3 (0.71, 15.4)	0.126	2.2 (0.31, 15.67)	0.387	2.4 (0.61, 9.68)	0.209	2.1 (0.48, 8.89)	0.325
Optimal social support	5.6 (0.87, 16.19)	0.070	6.5 (0.55, 19.46)	0.138	2.1 (0.57, 7.95)	0.259	1.7 (0.18, 3.05)	0.681
MDD								
Low social support	1.6 (0.18, 14.21)	0.655	2.4 (0.26, 15.26)	0.443	1.1 (0.40, 3.10)	0.836	1.4 (0.46, 4.48)	0.531
Moderate social support	2.1 (0.24, 17.97)	0.502	2.5 (0.27, 15.54)	0.413	1.2 (0.44, 3.71)	0.656	1.7 (0.52, 5.41)	0.384
Optimal social support	2.2 (0.23, 20.33)	0.503	2.8 (0.28, 21.26)	0.380	2.4 (0.88, 6.81)	0.088	3.3 (1.02, 10.63)	0.046
MMF								
Low social support	0.6 (0.07, 4.95)	0.611	0.6 (0.04, 8.39)	0.698	0.8 (0.21, 2.91)	0.713	0.8 (0.19, 3.38)	0.771
Moderate social support	0.7 (0.08, 6.07)	0.744	0.8 (0.06, 10.89)	0.852	1.0 (0.25, 4.16)	0.981	1.5 (0.32, 6.99)	0.612
Optimal social support	0.8 (0.08, 8.31)	0.873	0.9 (0.06, 12.58)	0.913	1.1 (0.29, 4.53)	0.844	1.7 (0.36, 8.12)	0.499
MAD								
Low social support	1.5 (0.18, 13.29)	0.702	2.4 (0.29, 20.33)	0.416	1.5 (0.53, 4.53)	0.428	1.9 (0.60, 5.94)	0.273
Moderate social support	1.9 (0.22, 16.04)	0.572	2.2 (0.26, 18.08)	0.479	1.7 (0.57, 5.32)	0.330	2.3 (0.71, 7.30)	0.169
Optimal social support	1.5 (0.15, 14.64)	0.727	2.0 (0.19, 19.77)	0.568	2.7 (0.93, 8.05)	0.068	3.6 (1.12, 11.69)	0.032
EFF								
Low social support	1.2 (0.14, 10.79)	0.855	0.9 (0.05, 13.98)	0.923	1.7 (0.46, 6.20)	0.430	2.0 (0.50, 7.99)	0.333
Moderate social support	1.5 (0.17, 13.18)	0.705	0.9 (0.06, 13.50)	0.944	2.9 (0.77, 10.88)	0.116	3.3 (0.80, 13.61)	0.098
Optimal social support	1.8 (0.19, 17.37)	0.605	0.7 (0.04, 12.30)	0.779	3.4 (0.93, 12.31)	0.065	4.7 (1.18, 18.87)	0.028

[‡]Results adjusted for the household head, food insecurity, years spent in refugee settlement, who supports the mother most, maternal occupation, age, education, ethnicity, religion, number of living children
OR-crude odds ratios; AOR-adjusted odds ratios; ISSSF- Introduction of solid, semi-solid, or soft foods; MDD-Minimum dietary diversity; MFF- Minimum meal frequency; MAD-Minimum acceptable diet; EFF-Egg and flesh food consumption; Maternal social support mean score categorized into optimal (>4 and ≤5); moderate (>3 and ≤4), low (>2 and ≤3), and none or very low support (≤2) Sherbourne and Stewart (1991); C – control, M- Moms-only, M&D-Moms & Dads study arms

Figures

Figure 1: Sample size chart of participants in the study



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CHAPTER VI

A PEER-LED INTEGRATED NUTRITION INTERVENTION USING THE CARE GROUP MODEL IMPROVED INFANT GROWTH IN SOUTH-SUDANESE REFUGEES IN POST-EMERGENCY SETTLEMENTS IN THE WEST NILE REGION IN UGANDA

Abstract

Several nutrition-sensitive interventions have been implemented to address undernutrition among refugee children in emergency and protracted settlements. However, the efficacy of these programs to reduce child undernutrition among refugees remain largely unknown. This study examined the effects on infant growth of a peer-led integrated nutrition education intervention with maternal social support using Care Groups among refugees in the West Nile region in Uganda. A longitudinal community-based randomized control trial was conducted among 390 women in the third trimester selected from different settlements (2 treatment arms and 1 Control arm) in Adjumani district, Uganda. The treatment arms, Moms-only (n=130) and Moms & Dads (n=143) & Control (n=117) had 10 – 20 members per group. The treatment arms were introduced to the peer-led integrated nutrition education intervention using the Care Group model

while the Control was not exposed to the intervention. The World Health Organization (WHO) standards were used for defining infant length-for-age z-scores (LAZ) for stunting, weight-for-age z-scores (WAZ) for underweight and weight-for-length z-scores (WLZ) for wasting. The Medical Outcomes Study (MOS) Social Support Index was used as a proxy to measure perceived maternal social support. A split-plot ANOVA was used to test the interaction effects of maternal social support, intervention, and time on infant growth. Post-hoc analyses were performed to determine the mean differences in infant growth among the study arms after adjusting for covariates. The Dinka were the most prevalent (63.5 %) ethnic group. More than half (55.6 %) of moms were stay-home spouses. The mean infant birth weight was 3.1 ± 0.5 kg. Over the study period, infant stunting was most prevalent in the Control arm (≥ 14 %) compared to Moms-only ($< 9.5\%$) and Moms & Dads ($< 7.4\%$) arms. There were significant interaction effects of the Care Group intervention and maternal social support by time on infant mean LAZ ($F_{(6, 560)} = 28.91, p < 0.001$), WAZ ($F_{(5.8, 539.4)} = 12.70, p = < 0.001$) and WLZ ($F_{(5.3, 492.5)} = 3.38, p = 0.004$). Simple main effects by the end of the study showed that the intervention improved infant mean LAZ (Moms-only vs Control (mean difference, MD) = 2.05, $p < 0.001$; Moms & Dads vs Control, $MD = 2.00, p < 0.001$) and WAZ (Moms-only vs Control, $MD = 1.27, p < 0.001$; Moms & Dads vs Control, $MD = 1.28, p < 0.001$). The interaction of maternal social support and a peer-led integrated nutrition intervention delivered through Care Groups significantly improved infant stunting and underweight but not wasting. Nutrition-sensitive approaches focused on reducing child undernutrition among refugees in post-emergencies should consider using the Care Group model for programs targeting infant growth.

Introduction

In 2020 the United Nations (UN) reported that of the 149.2 million stunted children aged 6-59 months the world over, the majority were in Africa and South Asia. However, Africa was the only continent where child stunting levels increased amidst reductions in other sub-regions over the past two decades [1]. Undernutrition is the leading health risk faced by children in low-and middle-income countries (LMICs) [2, 3]. LMICs host the highest proportion of refugees comprised of women and children the majority [4]. Displaced children are more vulnerable to undernutrition and poor health [5-9]. Humanitarian agencies have emphasized child undernutrition as one of the key areas for nutrition intervention during emergencies and post-emergency refugee situations [10]. Yet, a review of public health interventions in humanitarian contexts [11] indicated a limited focus on reducing growth failure among infants aged 0 - 12 months.

Among the refugees in Uganda, the overall prevalence of stunting in 2020 was high at 27.4 percent [12]. Child stunting levels in the West-Nile region were at 12.9 percent only, acceptable within humanitarian contexts [2], however, the lack of a table decline in child stunting trends for the past decade emphasized the need for sustainable interventions to consistently reduce child undernutrition [13]. Poor nutritional status during early childhood limits child growth, development, and the potential to thrive later in life [1, 14, 15], due to irreversible impairments [16-19]. However, nutrition-sensitive interventions addressing the underlying causes of infant undernutrition provided through peer support of child caretakers have the potential to reduce infant growth failure [20, 21]. Such interventions targeting behavioral change, when delivered in the first 1000 days

window of opportunity can have lasting impacts on child morbidity and mortality [13, 22-24].

Studies reviewing nutrition-sensitive interventions integrated with education and complementary feeding showed significant associations in reducing child stunting and underweight [25-28]. However, there is limited knowledge about the mechanisms of behavioral change in nutrition education interventions that impact child growth [29]. Health and nutrition-related interventions among refugee settlements have increased in the past three decades [30-32]. Yet, evidence on the effectiveness of these implemented interventions for improving infant growth in refugee contexts remains limited [11, 33]. Therefore, the purpose of this study was to determine the effects of a peer-led integrated nutrition education intervention delivered through the Care Group model on infant growth in the post-emergency refugee settlements in the West-Nile region in Uganda. The findings from this study can be used to scale up peer-led integrated nutrition-sensitive interventions and inform policies on strategies to prevent undernutrition in refugee communities.

Methods

Study design and setting

A community-based cluster-randomized controlled trial was conducted among refugees in post-emergency settlements in the West Nile region in Uganda. Adjumani District was randomly selected among the 10 districts hosting refugees in the region. Three of the 19 settlements in Adjumani District were randomly selected and assigned to one of two treatment arms of the study (Moms-only or mom & dads) or the Control arm. Ayilo-I settlement was assigned as Moms-only, Pagirinya and Ayilo II settlements were

the mom & dads (spouses) treatment arm while Nyumanzi was the Control arm. The settlements were six or more kilometers apart to reduce the possibility of spillover effects of the intervention.

Study participants

A sample size of 317 mothers was desired for strong power, based on calculations using GPower 3.1 software, with a type I error of 0.05, a power of 0.90, and an effect size of 0.2 for the prompt introduction of solid and semi-solid foods to infants as the primary outcome [34, 35]. With an estimated 23% loss during follow-up, 390 mothers were determined as the final desired sample size for the study. Village health team members (VHTs) and midwife assistants helped to identify 390 women in their 3rd trimester of pregnancy who were willing to participate. These women were enrolled before baseline data collection. Participants were assigned to Care Groups comprised of 10 – 20 members. Each of the treatment arms had a total of 10 Care groups while the Control also had 10 groups with no intervention. The study began in January 2020 and was completed in December 2020. A total of 321 mother-infant dyads completed the study.

The intervention

A peer-led integrated nutrition education intervention was delivered using the Care Group model to the two treatment arms. The intervention included peer-led training on group dynamics to emphasize group cohesion, infant feeding practices, best childcare practices, cooking demonstrations, and backyard farming demonstrations conducted over 10 months. In one treatment arm, Moms-only participated in the intervention while the other had a combination of Moms & Dads in the Care Groups. The Control arm received the standard of care which was the follow-up of mothers through the government health

services system structure with a VHT as a contact on an individual basis or preplanned community activities.

In the Care Groups, peer leaders were identified and trained based on prepared intervention modules to be used in the Care Group meetings. The training was conducted by the district nutrition and health educator supported by the VHTs working with the Care Groups and the researcher. Refresher training of the peer leaders was conducted in the monthly peer leaders' meetings. The peer leaders served as volunteer nutrition educators for the regular Care Group meetings and encouraged peer home visits as well as support of one another in the peer groups [36, 37]. Over the study period, the Care Group activities were supervised by the VHTs and the researcher. The Care Group meetings lasted 60 – 90 minutes every two weeks.

Measures

Mother-infant dyads were used as the unit of measure to assess the effects of Care Group intervention with maternal social support on infant growth during the study period. A structured questionnaire was used to collect data on the sociodemographic characteristics of mothers, infants, and households during the study. The medical outcomes social (MOS) support scale was used to estimate maternal social support [38]. Higher MOS scores indicated better support. Infant growth was measured using the World Health Organization (WHO) growth standards [39]. Stunting, wasting, and underweight were defined as less than -2 z-scores for length-for-age (LAZ), weight-for-length (WLZ), and weight-for-age (WAZ) respectively. Maternal and household characteristics were collected at baseline. The infant's birth date and weight were recorded from the mother's responses and cross-checked with the health monitoring card

provided at the health center to track the infant's growth and immunizations. Infant anthropometrics and characteristics were measured initially at Midline-I, then at Midline-II, and finally at Endline (Table 4S). All anthropometric measurements were performed in duplicate, the average calculated and used in analyses. Recumbent length was measured to the nearest 0.1 cm using a portable SECA plastic infantometer (model 417) on a flat surface. The mother's height was measured to the nearest 0.1 cm using a standard wooden UNICEF height board. Mother and infant had their weights measured simultaneously with light clothing and no shoes using a SECA 874 digital scale. Weights each were recorded to the nearest 0.1 kg.

Statistical analysis

For this study, a split-plot ANOVA was used because of the study effects of one categorical variable (two treatment arms and a control arm) across three-time points (Midline-I, II, and Endline) on continuous dependent variables measuring infant growth (LAZ, WAZ, and WLZ). The split-plot factorial analysis tested the interaction effects of the study arm, social support, and time on infant growth. Before completing the split-plot ANOVA, assumptions of normality, equal variances, and sphericity were checked. The Statistical Package for the Social Sciences (SPSS), v. 26 (IBM® SPSS® Statistics, Armonk, NY) was used for analyses with statistical significance set at $p < 0.05$.

Ethical approval

This study was approved by the Institutional Review Boards of the Uganda National Council of Science and Technology (SS 5038), Makerere University School of Health Science Research and Ethics Committee (SHSREC REF:2019-020), and Oklahoma State University (HS-19-2). Additional approval was acquired from the Office

of the Prime minister (OPM) Uganda (OPM/R/107). All respondents provided informed consent to participate in the study before the baseline, and before data collection during the study. Each respondent was provided with a compensation kit at each data collection period containing a 1 kg bar of washing soap, 200 mL of vitamin A fortified cooking oil, and half a kilo each of iodized salt and sugar, all worth about 7,600 Ugx (1.5 USD).

Results

Maternal sociodemographic characteristics

The characteristics of mothers and households within each arm are described in Table 1. More than half of mothers in the Moms & Dads arm (59.8 %) had formal education beyond lower primary compared to less than one-third in the Moms-only (31.3 %) and Control (33.3 %) arms. Overall, the Dinka comprised the majority (63.5 %) of the ethnic groups. Most of the mothers in the Control arm (71.8%) and the Moms-only arm (71.0%) were of the Anglican religion compared to the 24.6 percent in the Moms & Dads study arm. The maternal mean age was approximately the same across all study arms. The mothers in the Moms & Dads arm had the lowest mean height (mean, SD 164.0, \pm 7.3).

The average number of living children per household in all study arms was nearly 4. More than half of the mothers in the Moms & Dads and Control study arms reported their spouses as their best source of support compared to the proportion (40.3%) in the Moms-only study arm. Mothers in the Moms & Dads study arm had the highest mean social support score (mean \pm SD 61.0 \pm 8.8) followed by the Moms-only arm (52.7 \pm 8.0) and the Control arm (43.9 \pm 7.7). Maternal social support scores were significantly higher in both treatment arms than in the Control arm. Further, support in the Moms & Dads

arms was significantly better than support in the Moms-only arm (Supplementary Tables 2aS, and 2bS).

Over half of the households were female-headed and the average family size in all study arms was between eight and nine. Almost half in the Moms-only treatment arm had a high socioeconomic status compared to about a third in both Moms & Dads and Control arms. The mean length of stay in the West Nile Region for households in the Moms & Dads arm was about 4 years and was less than the other two arms. The highest (worst) mean household food insecurity access scale (HFIAS) score was reported for the Control arm followed by Moms-only and Moms & Dads arms (Table 1).

Infant characteristics and growth

Characteristics of infants and their growth indicators over time are reported in Table 2. The highest proportions of male infants (62.9%) was observed in the Moms & Dads arm compared to the Moms-only and the Control study arms; the highest proportion of female infants (56.6%) was observed in the control arm. The overall mean infant birth weight was 3.1kg (\pm 0.5) among all study arms.

The infants in the Control arm had the highest proportion of stunting in all study periods (14.1 – 20.9 %) when compared to the treatment arms (3.4 – 9.5 %). Similarly, infant underweight was highest (8.1 – 27.5 %) in the Control arm at each period compared to the treatment arms. Initially, the prevalence of infant wasting was low (\leq 5.2 %) among all study arms. However, infant wasting increased to 14.3% by the Endline among infants in the Control in contrast to the treatment arms in which infant wasting ranged from low to very low (1.8 % – 5.0 %) at the end of the study.

The Care Group intervention, maternal social support, and infant growth

The interaction and independent effects of the Care Group intervention and maternal social support were evaluated in terms of infant stunting, underweight, and wasting (Table 1aS – 1cS). The split-plot ANOVA assumptions (i.e., normality, homogeneity of variances, and sphericity) were tested. All measures within groups and time met the assumptions of normality ($p > .05$) and homogeneity of variances ($p > .05$). The Greenhouse-Geisser adjustment was applied to those measures not meeting the assumption of Sphericity ($p < .05$).

Effects of the Care Group intervention and maternal social support interaction on infant LAZ

There was a significant interaction between the Care Group intervention and maternal social support over time on infant mean LAZ ($F_{(6, 560)} = 28.91, p < 0.001$) (Table 1aS). The interaction had a large effect size ($f = 2.4$) [40], and explained 85 percent ($\hat{\omega}_{Y|A,B}^2 = 0.85$) of the variability in infant mean LAZ among the study arms after accounting for individual effects (Table 3S).

Simple main effects were further investigated with pairwise comparisons for study arm with maternal social support by time interaction (Table 3a) and for time by study arm with maternal social support (Table 3b). As illustrated in Figure 1, infants' mean LAZ in the Moms-only treatment arm at Midline-II were improved (mean difference (MD) = 1.07, $p < 0.001$) compared to Midline-I. The infant mean LAZ at the Endline also were higher than the mean LAZ at Midline-I in the Moms-only arm ($MD = 1.16, p < 0.001$). Infants in the Moms & Dads study arm experienced a decrease in mean LAZ between the Midline-I and Midline-II periods ($MD = -0.68, p < 0.001$). However, these LAZ scores improved between Midline-II and Endline ($MD = 0.92, p < 0.001$). In

the Control arm, the infants' mean LAZ scores decreased across successive times, Midline-I to Endline ($MD = -0.59, p = 0.011$).

The simple main effects of time by study arms with maternal social support (Table 3b) showed that at Midline-I, the infants' mean LAZ was higher in the Moms & Dads treatment arm than the Control ($MD = 1.17, p < 0.001$) and higher than in the Moms-only arm ($MD = 0.87, p < 0.001$). At Midline-II, infants in both the Moms-only ($MD = 1.80, p < 0.001$) and the Moms & Dads ($MD = 0.92, p < 0.001$) treatment arms had better mean LAZ scores compared to the Control. However, mean LAZ scores in the Moms-only treatment arm were higher than in the Moms & Dads arm ($MD = 0.88, p < 0.001$). At the end of the study, infants mean LAZ was higher in both the Moms-only ($MD = 2.05, p < 0.001$) and Moms & Dads ($MD = 2.00, p < 0.001$) treatment arms than the Control arm. Overall, by the end of the study, infants from both treatment arms had significantly higher mean LAZ scores than the infants from the Control arm, though, no significant differences in the infant mean LAZ in the treatment arms.

Effect of the intervention and social support on infant weight-for-age z-scores (WAZ)

There was a significant interaction effect of maternal social support in the study arm by study period ($F_{(5.8, 539.4)} = 12.70, p < 0.001$) on infant mean WAZ (Table 1bS). The interaction had a large effects size ($f = 1.6$) [40], and explained 72 percent ($\hat{\omega}_{Y|A,B}^2 = 0.72$) of the variability in infant mean WAZ (Table 3S). Further, the simple main effects results in Table 4a showed that the infant mean WAZ in the Moms-only study arm were significantly lower at Endline when compared to Midline-II ($MD = -0.23, p = 0.022$). In the Moms & Dads treatment arm, there was a decrease in the infant mean WAZ between Midline-I and Midline-II periods ($MD = -0.82, p < 0.001$). In contrast, the infant mean

WAZ improved in the Moms & Dads arm between Midline-II and the Endline period ($MD = 0.48, p < 0.001$). However, the infant mean WAZ at the Endline remained lower when compared to Midline-I ($MD = -0.34, p < 0.001$) in the Moms & Dads treatment arm (Figure 2).

The results in Table 4b showed that at Midline-I, there was a higher infant mean WAZ in both the Moms-only ($MD = 0.46, p = 0.042$) and Moms & Dads ($MD = 0.67, p = 0.006$) treatment arms than the Control arm. Also, at Midline-II, infants in both the Moms-only ($MD = 1.33, p < 0.001$) and Moms & Dads ($MD = 0.64, p = 0.024$) treatments had better mean WAZ than the Control. However, the Moms-only treatment arm had better infant mean WAZ than infants in the Moms & Dads treatment arm ($MD = 0.69, p < 0.001$). At the Endline period, infant mean WAZ was better in both the Moms-only ($MD = 1.27, p < 0.001$) and the Moms & Dads ($MD = 1.28, p < 0.001$) treatment arms compared to the Control. Overall, infant mean WAZ scores in both treatment arms were significantly better than the Control at all study periods. However, by the end of the study, there were no significant differences in the infant mean WAZ for the treatment arms.

Effect of the peer-led intervention and maternal social support on infant weight-for-length z-scores (WLZ)

The results in Table 1cS showed a significant interaction effect of maternal social support in study arms by period ($F_{(5.3, 492.5)} = 3.38, p = 0.004$). With a medium effects size ($f = 0.72$) [40], the interaction effect explained 34 percent ($\hat{\omega}_{Y|A,B}^2 = 0.34$) of the variability in infant mean WLZ (Table 3S). As shown in Figure 3 and Table 5a, infants' mean WLZ in the Moms-only treatment arm were reduced between both the Midline-I

and Midline-II periods ($MD = -0.85, p = <0.001$) and from Midline-II and Endline ($MD = -0.37, p = 0.001$). Also, the infant mean WLZ at the Endline was lower than the mean WLZ at Midline-I ($MD = -1.22, p < 0.001$). Similarly, the infant mean WLZ in the Moms & Dads treatment arm was lessened between both Midline-I and Midline-II periods ($MD = -0.45, p = 0.017$) and at the Endline when compared to the Midline-I period ($MD = -0.52, p = 0.002$). The results in Table 5a also showed that infant mean WLZ in the Control arm was significantly reduced from Midline-I to Midline-II ($MD = -0.96, p < 0.001$) and between the Endline and Midline-I period ($MD = -1.21, p < 0.001$). However, there was no significant change in the infant mean WLZ scores between the Midline-II and Endline periods in the Control arm.

Further, this study in Table 5b showed that at Midline-I, there were no significant differences in the infant mean WLZ between the treatment arms and the Control arm. Though infants in the Moms-only treatment arm had higher mean WLZ compared to the Moms & Dads arm at Midline-I ($MD = 0.61, p = 0.006$), however, by the end of the study, infants in all study arms had no significant differences in the mean WLZ scores.

In summary, significant interaction effects of maternal social support and Care Group by study period were observed with infant mean LAZ, WAZ, and WLZ. By the end of the study, the Moms-only and Moms & Dads treatment arms had infants with significantly better mean LAZ, and WAZ, but not WLZ when compared to the Control arm. For infant LAZ and WAZ, by Endline, no significant differences were observed between the Moms-only and Moms & Dads treatment arms.

Discussion

This year-long community RCT examined the effectiveness of a peer-led integrated nutrition education intervention on infant growth using the Care Group model among refugees in the West Nile region in Uganda. We showed that over the study period, there were significant interaction effects of the Care Group intervention with maternal social support on infant mean LAZ, WAZ, and WLZ scores. By the end of our study, in the treatment arms (Moms-only, and Moms & Dads), infant stunting (<5 %) and underweight (<10 %) were low while wasting ranged from medium to very low (≤ 5 %). However, in the Control arm, stunting (20.9 %), underweight (27.5 %), and wasting (14.3 %) were high according to WHO guidelines [41].

Our study findings showed that the interaction effects of the Care Group intervention and maternal social support significantly improved infant mean LAZ in both treatment arms compared to the infants in the Control arm by the end of the study. Further, the findings demonstrated a higher maternal social support score in treatment arms that participated in the Care Group intervention compared to the Control arm. The Care Group intervention provided a peer-assisted nutrition education learning platform through the biweekly meetings, in addition to the cooking demonstrations on the preparation of complementary foods. Further, engagement in backyard vegetable gardening advanced infant feeding knowledge, practices, and maternal social support, thus improved infant linear growth. The findings in our study were comparable to the results of two replications of the Care Group model in Mozambique [42] that reported a significant decrease in stunting of children under 5 years of age among communities that participated in a participatory nutrition intervention using the Care Group model.

A cluster-randomized trial (CRT) in Peru [43] and India [28] likewise demonstrated that children of caretakers who participated in group sessions of nutritional counseling and demonstrations of complementary foods preparation had better LAZ than children in control areas. One difference between our study and both the Peruvian and Indian CRT included the local context unique to the refugee situation. Additionally, the caretakers' training in Peru was done at health facilities by health workers rather than by peer-lead volunteers using the Care Group model as done in our study. Our intervention empowered mothers to impact their peers by becoming health educators and thus leveraging the health workers' responsibility mostly towards skilled care to patients in the health facilities. Further, a mixed-methods cross-sectional study in Thailand [44] conducted among refugee mothers of infants (2 - 12 months) in Mae La camp attributed improved infant linear growth to the increased social support for mothers provided through programs by non-governmental organizations. Our study based on peer-led integrated nutrition education with the Care Group model emphasized group cohesion and peer visits as part of group dynamics [45] evidenced by the increased social support scores in the treatment arms. Therefore, based on our findings, we expect that engaging mothers or child caretakers in a Care Group intervention over a longer period would sustainably improve infant linear growth among refugee children in post-emergency settlements.

The mean infant WAZ in our study was improved by the interaction between the Care Group and maternal social support over the study period. By the end of the study, both treatment arms had higher infant mean WAZ compared to the Control arm, Our findings were consistent with a systematic review of both randomized and non-

randomized studies in developing countries [25] which reported a significantly better infant mean WAZ of caretakers had participated in education interventions on complementary feeding practices for infants. However, a recent meta-analysis of three peer group nutrition intervention studies [46] in LMICs showed that the mother/peer group interventions had only a marginal reduction of 24 percent likelihood for underweight among children. In that metanalysis, the participation in backyard gardening for Care Group members together with the training modules on the value of foods improved both the skills and knowledge on nutrition to improve infant mean weight. A study in Kenya [47] explained that emphasis on Care Groups and setting up kitchen gardens was key in reducing undernutrition including micronutrient deficiencies among children.

By the end of our study, a general decline in the infant mean WAZ was observed in all study arms. The effect of the Care Group over time in our intervention on infant growth may have been affected by the COVID-19 pandemic. The intervention period coincided with the peak period of the global COVID-19 pandemic; although safe operating procedures (SOPs) were adopted, extra social interactions beyond the Care Group meetings such as the peer-to-peer home visits may have been limited. Also, face masks and distancing during Care Group meetings may have had physical or psychological effects on the perceived social support. A cross-sectional study in Taiwan [48] reported that restrictions on interactions among individuals were significantly associated with reduced perceptions of social support due to the voluntary reduction of interaction even when the risk of contracting the virus was lower based on demographics. Even though better maternal social support scores were observed in the treatment arms of

our study, the mean social support scores were moderate with a high standard deviation indicating variability in the perceived social support by mothers in all study arms. Amidst these findings, the positive effects of our findings on infant mean WAZ establish that the integrated intervention through Care Groups was a viable strategy to improve infant underweight and longer interventions may be beneficial.

Interaction effects of maternal social support and the Care Group intervention had significant effects on infant mean WLZ. However, by the end of the study, no significant differences were observed between the mean WLZ among the study arms. A longer study in Peru [43] of 187 infants enrolled from birth to 18 months of age observed significantly improved mean changes in WLZ over the study period within the intervention area compared to the control area. Behavioral change interventions may require a longer time [49] to positively transform participant barriers toward better infant feeding knowledge, attitudes, and practices (KAP) for improved WLZ among infants.

Our findings were similar to the outcomes of a community-based household survey in Uganda [50] which reported that maternal social support was not associated with child wasting. Similarly, a meta-analysis [46] determined a non-significant positive effect of the group interventions on child wasting explained by limited time for interventions to cause change in child growth. A systematic review of child growth in developing countries [25] likewise reported nonsignificant associations on WLZ based on nutritional education interventions. The reasons posited aligned with a recommendation of the need for an integrated nutrition education intervention with the provision of affordable complementary foods, especially in food-insecure areas. Increasing availability, access, and utilization of food through integrating livelihoods and food

security programs in the Care Group model may provide better results for overall child growth. Integrated multisectoral approaches of both direct and indirect programs that are nutrition-focused for example education, livelihoods, market subsidies, Care Group approach, and women's empowerment to mention but a few provide a holistic strategy to address underlying determinants of child malnutrition [17].

Our study provided cooking demonstrations using locally available foods and affordable recipe options from the markets within refugee settlements as part of complementary food preparation training. Further, Care Groups participated in backyard gardening of vegetables and nutrition education training expected to improve infant growth; however, variability in maternal social support within the treatment arms may have contributed to the non-significance in the intervention interaction effects on infant WLZ. Care Groups enabled peer mentoring and targeted the behavior of individuals, although social support is unique to individual behavior and perception. Therefore, mothers even within a Care Group may have had different perceptions of social support based on individual expectations creating variability in the social support scores reported [51].

Also, refugee household dietary practices may have been affected by food insecurity. By the end of the study, the households in our study reported a high level of food insecurity which may have affected infant complementary feeding and growth. Even with refugees engaging in farming on the plots around homesteads, also on communal agricultural land provided through the Government of Uganda [52], and with the provision of food rations by UNHCR, COVID-19 prevention measures such as lockdown may have affected household livelihoods that usually increased access to food sources.

Also, the large household sizes reported in our study imply a need for more food sources to meet the nutritional needs of all family members in addition to the complementary feeding of infants [53]. Further, both short-term and long-term child growth may be affected by enteropathies that have a high incidence in protracted refugee settings due to congestion in the settlements and households and limited source of safe water [54]. Based on our findings, we agree with previous literature [17, 46, 49] that our peer-led integrated nutrition intervention via Care Groups may have required more time for the effects of the intervention to fully impact the growth of children. Also, the COVID-19 pandemic may have exacerbated the need for more time, especially with the interruptions to the implementation of the study.

To our knowledge, this study was the first to examine the effectiveness of a peer-led integrated nutrition intervention using the Care Group model on infant growth among infants in refugee post-emergency settlements. The strengths of this study included the use of a RCT design which allowed us to establish causation. Also, this study used valid and reliable scales to assess infant growth and maternal social support. Even though the MOS support scale had not previously been used for studies in a refugee setting, our findings were consistent with studies conducted in rural communities in LMICs [47, 50, 55]. Further, the study had a large sample size that provided a good representation of South Sudanese refugees in the West Nile region in Uganda. However, our study may have been impacted by the COVID-19 pandemic rules that changed the Care Groups of 10 – 20, to only five to ten for part of the intervention time. Also, the measure of maternal social support was based on the mother's perception and may not be exempt from social desirability bias.

Despite these limitations, the unique findings of this study provided evidence of the efficacy of the behavioral change Care Group intervention with maternal social support on the reduction of infant undernutrition among refugees in post-emergency settlements. The Care Group model has been suggested to fit within the standard government health structure under the Ministry of Health [56]. The Refugee and Host Population Empowerment (ReHoPE) strategy [52] integrates all refugee community services with the host population to refugees within the settlements. Therefore, even though a longer duration may be beneficial, integrating the Care Group model in nutrition and health programs in post emergency refugee communities would provide a sustainable cost-effective approach to reducing child undernutrition.

Conclusion

This study demonstrated that a peer-led integrated nutrition education intervention using the Care Group model with maternal social support improved infant stunting and underweight. The Care Group model as a behavioral change strategy may provide an opportunity for parents supported by peers to recognize health challenges and work towards improvement. This study advances our knowledge of the interactions of the Care Group model and the proximal interpersonal relations through maternal social support that promote infant growth before their first birthday. Our findings provide evidence for a sustainable and cost-effective approach to reducing infant undernutrition among South-Sudanese refugees in the post-emergency settlements in Uganda.

Tables

Table 1: Maternal sociodemographic characteristics

Maternal Variable	Control Arm	Moms-only Arm	Moms & Dads Arm	p-value
	Mean ± SD or % (n)	Mean ± SD or % (n)	Mean ± SD or % (n)	
Education level				
No formal education	49.6 (58)	45.8 (60)	18.3 (26)	<0.001
Lower primary	17.1 (20)	22.9 (30)	21.8 (31)	
Upper primary	26.5 (31)	26.7 (35)	38 (54)	
Secondary and higher	6.8 (8)	4.6 (6)	21.8 (31)	
Marital status ¹				
Married	98.0 (97)	96.8 (122)	99.2 (132)	0.371
Ethnicity				
Dinka	96.0 (95)	88.8 (111)	16.1 (20)	<0.001
Madi	3.0 (3)	11.2 (14)	66.9 (83)	
Other	1.0 (1)	0.0 (0)	16.9 (21)	
Religion				
Catholic	2.6 (3)	16.8 (22)	50.6 (72)	<0.001
Anglican	71.8 (84)	71.0 (93)	24.7 (35)	
Other	25.6 (30)	12.2 (16)	24.7 (35)	
Maternal age, yrs.	27.5 ± 4.9	28.4 ± 5.0	27.3 ± 5.2	0.186
Mother's height ² , cm	169.8 ± 6.2	169.1 ± 7.0	164 ± 7.3	<0.001
Number of living children [†]	3.9 ± 2.2	3.8 ± 2.1	3.6 ± 2.6	0.447
Place of childbirth ¹				
Home or other	8.1 (8)	0.8 (1)	0.8 (1)	0.002
Local health center	70.7 (70)	79.4 (100)	71.2 (94)	
Hospital	21.2 (21)	19.8 (25)	28 (37)	
Type of childbirth ¹				
C-Section	4.0 (4)	5.6 (7)	6.8 (9)	0.662
Vaginal	96.0 (95)	94.4 (119)	93.2 (123)	

Supports the mother most

Partner/husband	52.3 (46)	40.3 (48)	59.1 (68)	0.051
Peers or Neighbors	11.4 (10)	19.3 (23)	7.8 (9)	
Other relatives	21.6 (19)	30.3 (36)	14.8 (17)	
Other non-relatives	6.8 (6)	4.2 (5)	13.9 (16)	
No one	8.0 (7)	5.9 (7)	4.3 (5)	
Overall social support score ^{§†}	43.9 ± 7.7	52.7 ± 8.0	61.0 ± 8.8	<0.001
Household Variables				
Household head sex				
Female	67.7 (67)	72.2 (91)	53.3 (72)	0.004
Family size	8.59 ± 3.63	8.38 ± 3.07	7.97 ± 3.36	0.316
Socioeconomic status				
Low	41.0 (48)	30.5 (40)	45.8 (65)	0.060
Medium	23.1 (27)	19.8 (26)	18.3 (26)	
High	35.9 (42)	49.6 (65)	35.9 (51)	
Years living in refugee area [†]	5.1 ± 1.8	4.8 ± 1.8	4.1 ± 1.3	<0.001
HFIAS²	10.2 ± 5.3	9.7 ± 6.0	8.0 ± 5.2	0.011

¹ Variables collected at Midline-I after the infant was born; ² variables collected at Endline; HFIAS- Household Food Insecurity Access Scale; [†] Mean scores and standard deviations respectively and study arm means differences performed with ANOVA; [‡]Proportion differences among groups tested using chi-square; [§]Average maternal social support score over the study period calculated using the medical outcomes social support scale

Table 2: Infant characteristics and growth

Infant Variables	Midline-I			Midline-II			Endline		
	Control % (n=99)	Moms-only % (n=126)	Moms & Dads % (n=133)	Control % (n=92)	Moms-only % (n=125)	Moms & Dads % (n=121)	Control % (n=91)	Moms-only % (n=119)	Moms & Dads % (n=110)
Infant sex									
Male	43.4	48.4	62.9	-	-	-	-	-	-
Female	56.6	51.6	37.1	-	-	-	-	-	-
Infant birthweight, kg, mean ± SD	3.1 ± 0.4	3.0 ± 0.5	3.2 ± 0.5	-	-	-	-	-	-
Infant age, mo., mean ± SD	3.2 ± 1.2	3.0 ± 1.5	3.2 ± 1.4	6.9 ± 1.2	6.3 ± 1.6	7.0 ± 1.4	8.2 ± 1.2	7.7 ± 1.6	8.3 ± 1.4
Infant growth[†]									
Stunted									
No	85.9	90.5	95.6	82.6	95.2	92.6	79.1	96.6	96.4
Yes	14.1	9.5	4.4	17.4	4.8	7.4	20.9	3.4	3.6
Underweight									
No	91.9	96.0	96.3	79.4	92.0	93.4	72.5	95.0	97.3
Yes	8.1	4.0	3.7	20.7	8.0	6.6	27.5	5.0	2.7
Wasted									
No	95.0	95.2	94.8	88.0	96.8	95.9	85.7	95.0	98.2
Yes	5.0	4.8	5.2	12.0	3.2	4.1	14.3	5.0	1.8

kg – kilogram; mo. – months; SD – Standard Deviation; [†]WHO child growth indicators

Table 3a: Simple main effects of the study arm and social support-time interaction on infant mean LAZ

Study arm	(I) Time	(J) Time	(I-J) ^b	S.E
Moms-only	Midline-II	Midline-I	1.07***	0.13
		Endline	-0.10	0.11
	Endline	Midline-I	1.16***	0.12
		Midline-II	0.10	0.11
Moms & Dads	Midline-II	Midline-I	-0.68***	0.14
		Endline	-0.92***	0.13
	Endline	Midline-I	0.24	0.13
		Midline-II	0.92***	0.13
Control	Midline-II	Midline-I	-0.43	0.22
		Endline	0.16	0.19
	Endline	Midline-I	-0.59*	0.20
		Midline-II	-0.16	0.19

S.E standard error; Tukey HSD correction applied; ^b Mean LAZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3b: Simple main effects of the time-study arm and social support interaction on infant mean LAZ

Time	(I) Study arm	(J) Study arm	(I-J) ^b	S.E
Midline-I	Moms-only	Control	0.30	0.21
		Moms & Dads	-0.87***	0.16
	Moms & Dads	Control	1.17***	0.24
		Moms-only	0.87***	0.16
Midline-II	Moms-only	Control	1.80***	0.24
		Moms & Dads	0.88***	0.18
	Moms & Dads	Control	0.92**	0.27
		Moms-only	-0.88***	0.18
Endline	Moms-only	Control	2.05***	0.22
		Moms & Dads	0.05	0.16
	Moms & Dads	Control	2.00***	0.25
		Moms-only	-0.05	0.16

S.E standard error; Tukey HSD correction applied; ^b Mean LAZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4a: Simple main effects of the study arm and social support-time interaction on infant mean WAZ

Study arm	(I) Time	(J) Time	(I-J) ^b	S.E
Moms-only	Midline-II	Midline-I	0.08	0.10
		Endline	0.23*	0.09
	Endline	Midline-I	-0.15	0.09
		Midline-II	-0.23*	0.09
Moms & Dads	Midline-II	Midline-I	-0.82***	0.11
		Endline	-0.48***	0.10
	Endline	Midline-I	-0.34**	0.10
		Midline-II	0.48***	0.10
Control	Midline-II	Midline-I	-0.80***	0.18
		Endline	0.17	0.15
	Endline	Midline-I	-0.96***	0.16
		Midline-II	-0.17	0.15

S.E standard error; Tukey HSD correction applied; ^b Mean WAZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4b: Simple main effects of the time-study arm and social support interaction on infant mean WAZ

Time	(I) Study arm	(J) Study arm	(I-J) ^b	S.E
Midline-I	Moms-only	Control	0.46*	0.19
		Moms & Dads	-0.21	0.14
	Moms & Dads	Control	0.67**	0.21
		Moms-only	0.21	0.14
Midline-II	Moms-only	Control	1.33***	0.21
		Moms & Dads	0.69***	0.16
	Moms & Dads	Control	0.64*	0.24
		Moms-only	-0.69***	0.16
Endline	Moms-only	Control	1.27***	0.19
		Moms & Dads	-0.02	0.14
	Moms & Dads	Control	1.28***	0.21
		Moms-only	0.02	0.14

S.E standard error; Tukey HSD correction applied; ^b Mean WAZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5a: Simple main effects of the study arm and social support -time interaction on infant mean WLZ

Study arms	(I) Time	(J) Time	(I-J) ^b	S.E
Moms-only	Midline-II	Midline-I	-0.85***	0.14
		Endline	0.37**	0.10
	Endline	Midline-I	-1.22***	0.13
		Midline-II	-0.37**	0.10
Moms & Dads	Midline-II	Midline-I	-0.45*	0.16
		Endline	0.08	0.11
	Endline	Midline-I	-0.52**	0.15
		Midline-II	-0.08	0.11
Control	Midline-II	Midline-I	-0.96***	0.25
		Endline	0.25	0.18
	Endline	Midline-I	-1.21***	0.23
		Midline-II	-0.25	0.18

S.E standard error; Tukey HSD correction applied; ^bMean WLZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5b: Simple main effects of the time-study arm and social support interaction on infant mean WLZ

Time	(I) Study arm	(J) Study arm	(I-J) ^b	S.E
Midline-I	Moms-only	Control	0.23	0.26
		Moms & Dads	0.61*	0.20
	Moms & Dads	Control	-0.38	0.30
		Moms-only	-0.61*	0.20
Midline-II	Moms-only	Control	0.35	0.22
		Moms & Dads	0.21	0.17
	Moms & Dads	Control	0.13	0.26
		Moms-only	-0.21	0.17
Endline	Moms-only	Control	0.22	0.21
		Moms & Dads	-0.09	0.16
	Moms & Dads	Control	0.30	0.24
		Moms-only	0.09	0.16

S.E standard error; Tukey HSD correction applied; ^bMean WLZ differences included interactive effects of maternal social support in Study arm; * $p < .05$, ** $p < .01$, *** $p < .001$

Supplementary tables

Table 1aS: Tests of within-subjects effects on infant length-for-age z-scores (LAZ)^a

Variable [†]	Type III SS	df	Mean square	F	sig.
Study arm*social support score	139.27	6.00	23.21	28.91	<0.001
Study arm	76.02	4.00	19.00	24.75	<0.001
Social support score	19.16	2.00	9.58	12.12	<0.001
Infant age	0.37	2.00	0.19	0.23	0.791
Supports mother the most	5.81	2.00	2.91	3.67	0.026
Number of living children	1.17	2.00	0.59	0.74	0.477
Mother's height	2.36	2.00	1.18	1.49	0.226
Socioeconomic status	0.84	2.00	0.42	0.53	0.590
Religion	0.45	2.00	0.23	0.29	0.750
Child sex	4.74	2.00	2.37	2.99	0.051
Childbirth weight	2.92	2.00	1.46	1.85	0.159
Ethnicity	10.96	2.00	5.48	7.25	0.010
Error (Time)	443.57	560.00	0.79		

^a Sphericity assumed; [†] within-subjects effects assessed with time effect; SS sum of squares; df degrees of freedom

Table 1bS: Tests of within-subjects effects on infant weight-for-age z-scores (WAZ)[†]

Variable [†]	Type III SS	df	Mean square	F	sig.
Study arm*social support score	36.73	5.76	6.38	12.70	<0.001
Study arm	20.63	3.85	5.16	10.32	<0.001
Social support score	2.00	1.88	1.06	2.12	0.160
Infant age	0.71	1.93	0.37	0.73	0.476
Supports mother the most	0.72	1.93	0.38	0.75	0.469
Number of living children	0.85	1.93	0.44	0.88	0.411
Mother's height	0.15	1.93	0.08	0.15	0.852
Socioeconomic status	0.15	1.93	0.08	0.16	0.846
Religion	0.17	1.93	0.09	0.17	0.834
Child sex	1.82	1.93	0.95	1.88	0.155
Childbirth weight	2.67	1.93	1.39	2.76	0.066
Ethnicity	2.96	1.93	1.55	0.05	0.011
Error (Time)	270.70	539.38	0.50		

[†] Greenhouse-Geisser correction; [†] within-subjects effects assessed with time effect; SS sum of squares; df degrees of freedom

Table 1cS: Tests of within-subjects effects on infant weight-for-length z-scores (WLZ)[†]

Variable [†]	Type III SS	df	Mean square	F	sig.
Study arm*social support score	18.24	5.28	3.46	3.38	0.004
Study arm	11.86	3.52	3.38	3.24	0.016
Social support score	3.06	1.75	1.74	1.67	0.193
Infant age	0.39	1.76	0.22	0.21	0.780
Supports mother the most	3.34	1.76	1.90	1.84	0.165
Number of living children	0.48	1.76	0.27	0.26	0.741
Mother's height	0.02	1.76	0.01	0.01	0.984
Socioeconomic status	0.45	1.76	0.26	0.25	0.752
Religion	1.39	1.76	0.79	0.76	0.451
Child sex	0.24	1.76	0.14	0.13	0.849
Childbirth weight	0.85	1.82	0.47	0.46	0.610
Ethnicity	0.28	1.77	0.16	0.15	0.838
Error (Time)	509.25	492.47	1.03		

[†] Greenhouse-Geisser correction; [†] within-subjects effects assessed with time effect; SS sum of squares; df degrees of freedom

Table 2aS: Association among study arms and maternal social support in Adjumani post-emergency settlements

Groups	df	MS	F	p-value
Between groups	2	25076.53	373.17	<0.001
Within groups	1170	67.2		
Total	1172			

Table 2bS: Pairwise comparisons of study arm and maternal social support in Adjumani post-emergency settlements

(I) Group	(J) Group	MD (I-J)	Std. Error
Control	Moms-only	-8.8***	1.2
	Moms & Dads	-17.1***	1.3
Moms-only	Control	8.8***	1.2
	Moms & Dads	-8.3***	1.1
Moms & Dads	Control	17.1***	1.3
	Moms-only	8.3***	1.1

MD-mean difference; Tukey HSD correction applied for unequal sample sizes; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3S: Determination of strength of association and effects size

Measure Formula	Measure description	Study arm*social support for infant LAZ	Study arm*social support for infant WAZ	Study arm*social support for infant WLZ
$\hat{\omega}_{Y A:B}^2 = \frac{\frac{p-1}{np}(MSTreat - MSE)}{\frac{p-1}{np}(MSTreat - MSE) + MSE}$	Measure of association	0.850	0.723	0.341
$\hat{f}_* = \sqrt{\frac{\hat{\omega}_{Y *}^2}{1 - \hat{\omega}_{Y *}^2}}$	Effects size	2.38	1.62	0.719

$\hat{\omega}_{Y|A:B}^2$ strength of association; \hat{f}_* effects size; p, study arms; n, number of levels(time); MSTreat mean square treatment(interaction); MSE mean square error

Table 4S: Summary of the data collection

Study Period	Month	Activity/data collected
Pre-baseline	January -mid February	Participant recruitment (pregnant women, 3 rd trimester)
Baseline	End of February - Early March	<ul style="list-style-type: none"> • Sociodemographic • Maternal social support Activity
Midline-I	June	<ul style="list-style-type: none"> • Intervention started after baseline • Child growth • Breastfeeding • Sociodemographic • Maternal social support Activity
Midline-II	October	<p>Intervention continued</p> <ul style="list-style-type: none"> • Child growth • Breastfeeding • Complementary feeding • Sociodemographic • Maternal social support Activity
Endline	December	<p>Intervention continued</p> <ul style="list-style-type: none"> • Child growth • Breastfeeding • Complementary feeding • Sociodemographic • Maternal social support Activity <p>Intervention continued</p>

Figures

Figure 1: Infant length-for-age z-scores (LAZ) for study arm, social support, and time interaction

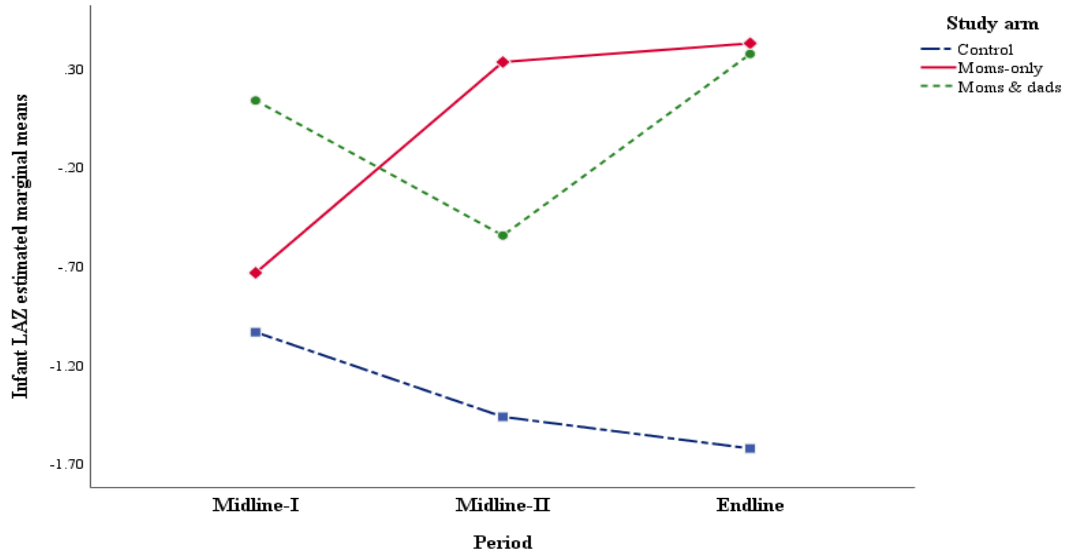


Figure 2: Infant weight-for-age z-scores (WAZ) for study arm, social support, and time interaction

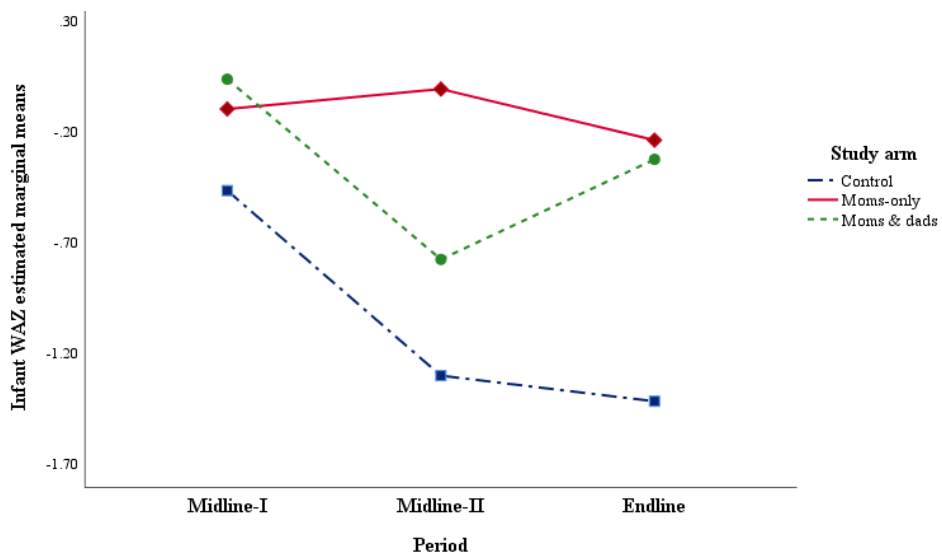
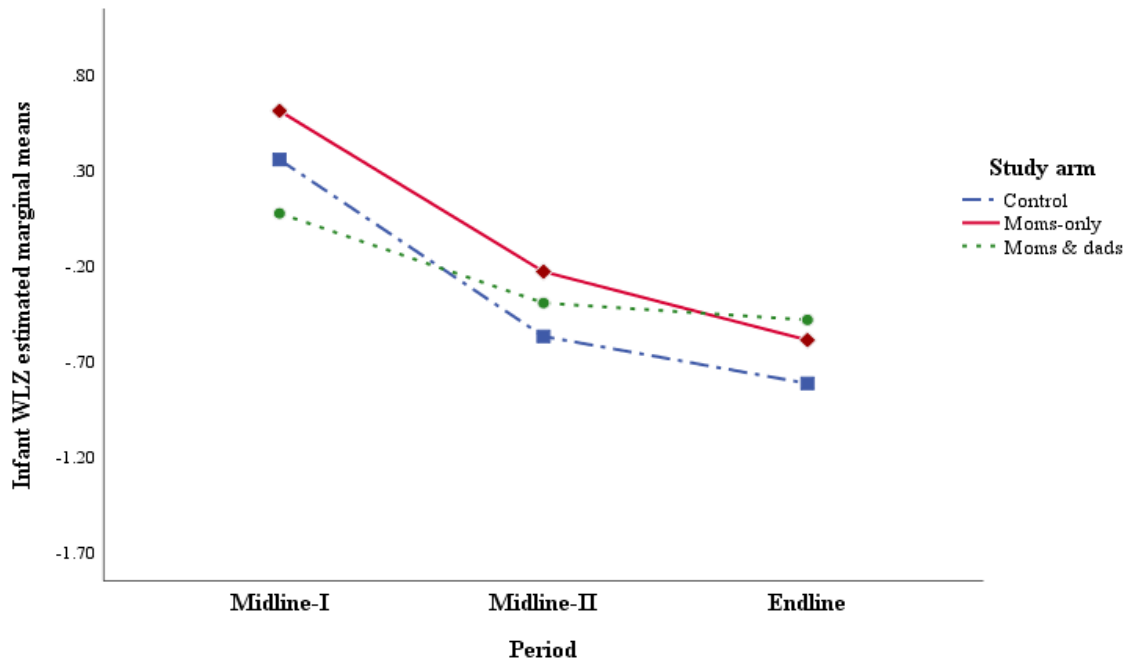


Figure 3: Infant weight-for-length z-scores (WLZ) for study arm, social support, and time interaction



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CHAPTER VII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purposes of this study were 1) to investigate maternal social support among refugees in the post-emergency settlements in the West-Nile region in Uganda, and 2) to examine the effectiveness of a peer-led integrated nutrition education intervention implemented using the Care Group model on complementary feeding of infants and their growth in post-emergency settlements in the West Nile region in Uganda. Both qualitative and quantitative research approaches were used to investigate maternal social support and to examine effects of the Care Group intervention on infant nutrition and growth among refugees in post-emergency settlements in Uganda.

Key findings and recommendations

The barriers to maternal social support comprised three themes: lack of resources, cultural norms, and spousal consensus on roles. In the refugee settlements, the participants mentioned that resources were inadequate, further accentuating that whatever was available to them as aid was only sufficient to meet personal and household needs. Meager resources with regards to household items would not allow for them to share with others who were also in need of support.

Spousal consensus on roles as a barrier focused on fathers not supporting their spouses with household chores and childcare; instances where fathers participated, were only circumstantial. For example, fathers mostly helped with household chores when mothers were unavailable at home, and when there was no relative old enough to assist with chores around the home. The participants vehemently cited that culturally fathers were not to bother themselves with household chores and childcare as those were roles stereotypically reserved for women. Encompassed in culture, participants voiced the indignity associated by society with men engaging in chores at home, and also cited how such practices contravened their ethnic traditions as further justification for refraining from engaging in housework.

Five facilitators of maternal social support among refugees included: community and culture, physical and tangible support, social support structures, support sources, and extended postpartum rest. The participants expressed that within the community, support may be acquired through family, local leaders, and neighbors. Additionally, they noted that conforming to their cultural practices, when one of the community members had a problem, they would come together within ethnic structures such as clans to solve the challenge as a means of social support. Also getting support with household chores and childcare, receiving financial support in the form of aid or credit, and helping in solving domestic conflicts were mentioned under the physical and tangible support theme.

Under the social support structures theme participants identified that support from spouses, other relatives, local organizations, neighbors, and friends eased the responsibility burden on mothers. Additionally, the participants noted spiritual support,

local leaders, local institutions, neighbors, friends, and family were facilitators of maternal social support especially in providing help with challenges. Examples were childcare for a limited period, help with financial problems, and advice on a challenge in one's household. Although the participants' views varied on the length of time before a mother should resume her routine duties postpartum, there was a consensus on the need for a restful period after giving birth to a child. Shorter periods of postpartum rest were explained by the lack of people around the home to assist the mother; however, the majority of participants stated that an extended postpartum period was a component of maternal social support.

The identified perceptions of social support among refugee mothers were comprised of four themes: social interactions, financial support, advice and counseling, and mothers feeling some level of support. Mothers being able to interact with neighbors, friends, and relatives, sharing information, experiences, and ideas, and being somehow understood by family and friends were all ways in which maternal social support was perceived among refugee mothers.

In summary, our study identified key barriers, facilitators, and perceptions of maternal social support among refugees in post-emergency settlements in Uganda. This was the first study to our knowledge to describe these factors of maternal social support among refugees in LMICs. Therefore, these findings have the potential to inform indirect health and nutrition-centered approaches targeting barriers, facilitators, and perceptions of maternal social support as a social behavioral change communication (SBCC) strategy to improve IYCF practices and child growth.

Our study also showed that most ($\geq 87.4\%$) of the refugee mothers in the treatment arms (Moms-only and Moms & Dads) introduced their infants to solid and semi-solid foods (ISSSF) between 6–8 months of age compared to less than two-thirds in the Control arm (66.2% at Midline-II and 65.6% at Endline). Less than half of infants (age range 6-11 months) in all study arms met the minimum dietary diversity (MDD), however, more than 81.8 percent of infants in all study arms met the minimum meal frequency (MMF) by Endline. Also, more infants in the treatment arms ($>38\%$) met the minimum acceptable diet (MAD) compared to infants in the Control arm (24.1%). By the Endline, the highest proportion of infants that consumed eggs and or flesh foods (EFF) was in the Moms & Dads treatment arm (33.0%), followed by the Moms-only arm (29.0%) and the Control arm (18.2%)

There was a positive effect of the Care Group intervention on the introduction of solid, semi-solid, or soft foods (ISSSF). The infants in the treatment arms (Moms-only and Moms & Dads arms) were significantly more likely to receive ISSSF at both Midline-II and Endline when compared to the Control arm. Infant MDD was significantly better at the Endline only for the Moms & Dads' treatment arm. There was no significant association among the study arms and infant MMF by Endline. However, there was a higher likelihood of meeting MAD at Endline for both treatment arms compared to the Control. Only infants in the Moms & Dads arm had a significant association between the intervention and EFF and were more likely to consume eggs and flesh foods at both Midline-II and Endline periods. Also, higher maternal social support was significantly associated with better infant MDD, MAD, and EFF at Endline.

Our results showed that engaging both fathers and mothers in the Care Group intervention improved the practices of complementary feeding of infants. Also, improved maternal social support was beneficial for infant complementary feeding practices. Our findings may be used in designing nutrition-sensitive programs such as peer-led integrated nutrition education interventions using Care Groups to improve infant nutrition in post-emergencies and complex environments similar to humanitarian settings.

By the Endline, the overall proportion of stunting among infants was 8.4 percent, 10.6 percent of infants were underweight and 6.5 percent were wasted. However, within the study arms, proportions of child growth failure were higher in the Control arm (≥ 14.3 %) compared to Moms-only (≤ 5 %) and Moms & Dads (≤ 3.6 %) arms. Our findings showed that there were significant interaction effects of the Care Group intervention and maternal social support by time on infant mean length-for-age z-scores (LAZ), weight-for-age z-scores (WAZ), and weight-for-length z-scores (WLZ). Our analyses of simple main effects at Endline showed that the interaction effects of Care Group intervention and maternal social support improved infant mean LAZ and WAZ in the treatment arms when compared to the Control. However, the interaction of the Care Group intervention and maternal social support was not significantly different for infant mean WLZ among all study arms. Humanitarian agencies and refugee host countries implementing nutrition-sensitive approaches focused on reducing child undernutrition among refugees in post-emergencies may consider using the Care Group model for programs targeting infant growth.

In summary, our study findings provided evidence for the value of implementing a Care Group intervention on infant nutrition and growth. Further, our findings also showed that maternal social support as an SBCC approach was beneficial for both complementary feeding practices of infants and reducing infant undernutrition among South Sudanese refugees in post-emergency settlements. Humanitarian partners may consider such an intervention as an indirect nutrition-focused approach because of the opportunities for addressing societal and cultural stereotypes which may improve barriers, perceptions, and facilitators of maternal social support. Further, this intervention showed the potential of a cost-effective strategy to sustainably reduce the refugees' dependence on humanitarian aid while supporting fellow refugees to improve infant and child nutrition and growth by positively impacting caretakers' behaviors and self-reliance.

Areas of future research

Our results on the associations between maternal social support and infant nutrition and growth were similar to recent studies that adopted the Medical Outcomes Study (MOS) social support scale within rural areas in LMICs [36, 41]. However, there is a need to validate the MOS scale in assessing maternal social support for both rural contexts and humanitarian situations to increase the reliability of the measures regarding associations with infant and young child feeding practices and growth. Performing a confirmatory factor analysis (CFA) using data on maternal social support from post-emergency situations would determine how effective the MOS scale is in assessing maternal social support among post-emergency refugee communities.

The Care Group intervention provided positive results for most indicators of complementary feeding of infants and growth by the Endline period. However, the marginal improvements or absence of significant differences between one or both treatment arms and the Control for some indicators of infant feeding (MDD, MFF, and EFF) and growth (infant mean WLZ) may be attributed to the need for an extended period for the intervention [169] for more positive results. Future research should consider a longer intervention period that would allow for more time intervals for data collection to provide trend analyses. Perhaps mothers could be recruited earlier in their pregnancy (1st trimester) and followed for at least 2 years after childbirth. A longer intervention period also presents the opportunity for an extended period to build strong social connections among the Care Groups.

Further, our year-long study was completed when infants were between 6 – 11 months old. While this period is critical for child growth, existing literature [3, 64, 79] also emphasizes the importance of the entire period from conception to a child's second birthday, commonly referred to as the first 1000 days, as a window of opportunity for child growth and development. Normalizing improved feeding behaviors during and beyond the child's second year improves thriving and survival, while the lack of sustenance of the improved behavior due to shorter periods of the intervention may still allow growth faltering within the critical period. Considering a longer period for the intervention to follow-up children to their second birthday would better test the effectiveness and sustainability of the intervention. Improved nutrition throughout the first 1000 days is associated with better health in the future [170, 171]. Also, the length of

our study period did not allow us to assess the effects of the intervention on indicators such as continued breastfeeding, which would be possible with a longer study.

The effects of the Care Group intervention have the potential to cascade to other groups (neighbor groups) that are created members of the Care Group to share training and skills learned through the biweekly intervention meetings [172]. Some of the participants in the Care Group intervention may additionally train another group of 10 – 20 participants in the community (neighbor groups) that have children under the age of 24 months. This wider community reach through the intervention is one of the justifications for the Care Group intervention can serve as a viable SBCC approach for improved maternal and child health and nutrition. There is a need to examine the effects of the Care Group intervention on neighbor groups and their IYCF practices and child growth.

Our study intervention involved fathers in one of the treatment arms (Moms & Dads arm) which showed significant improvements in infant complementary feeding and growth. Further research is needed to assess the experiences of social support of other caretakers such as grandparents, and older relatives within households having children under five years of age in post-emergency settlements. Engaging older relatives in households having children under 2 years of age in a similar intervention may increase social support to a mother and improve child care, thus enhancing child nutrition and growth.

Future research may also consider a mixed-methods study to assess barriers and facilitators of IYCF affecting caretakers of children (< 24 months of age) among South

Sudanese refugees. Further, the study may provide better context explaining the quantitative findings in relation to key aspects of child caretakers' behavior and attitudes that influence complementary feeding of infants by post-emergency refugees. Such findings may give insights into potential modifications for future peer-led integrated nutrition education interventions to have even better effects on child nutrition and growth in humanitarian situations and complex areas.

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APPENDICES

APPENDIX A: Indicators for Measuring Infant and Young Child Feeding Practices (WHO & UNICEF Guidelines)

Indicator	Abbreviation	Description	Age category
<i>Breastfeeding</i>			
Ever breastfed	EvBF	Proportion of children aged less than 2 years who have ever been breastfed.	Children less than 24 months
Early initiation of breastfeeding	EIBF	Proportion of children aged less than 2 years who breastfed within the first hour of their birth.	Children less than 24 months
Exclusively breastfed for the first two days after birth	EBF2D	Proportion of children aged less than 2 years who breastfed exclusively for the first two days after birth.	Children less than 24 months
Exclusive breastfeeding under six months	EBF	Proportion of infants aged 0 – 5 months who consumed exclusively breast milk in the past 24 hours.	Infants aged 0 – 5 months
Mixed milk feeding under six months	MixMF	Proportion of infants aged 0 – 5 months who consumed breast milk but also had formula and or animal milk in the past 24 hours.	Infants 0 – 5 months of age
Continued breastfeeding 12–23 months	CBF	Proportion of infants aged 12 – 23 months who consumed breast milk in the past 24 hours.	Children aged 12 – 23 months
<i>Complementary feeding</i>			
Introduction of solid, semi-solid, or soft foods 6–8 months	ISSSF	Proportion of infants aged 6 – 8 months who in the past 24 hours consumed solid, semi-solid or soft foods, and continually breastfed.	Children aged 6 – 8 months

Minimum dietary diversity 6–23 months	MDD	Proportion of children in the age category 6 – 23 months who in the pasts 24 hours consumed at least five food groups of the recommended eight. The food groups include - currently breastfed; roots and tubers; grains; flesh foods (meat, fish, poultry, and organ meats); legumes and nuts; dairy products; vitamin A-rich fruits and vegetables; eggs; other fruits and vegetables.	Children aged 6 – 23 months
Minimum meal frequency 6–23 months	MMF	Proportion of infants in the age category 6 – 23 months who in the past 24 hours consumed solid, semi-solid or soft foods including snacks the recommended minimum number of times for both breastfed and non-breastfed infants. That is, a minimum of <ul style="list-style-type: none"> • 2 feedings for breastfed infants 6 – 8 months of age • 3 feedings for breastfed children in the 9 – 23 months of age category • 4 feeding for non-breastfed children in 6 – 23 months age category. 	Children aged 6 – 23 months
Minimum milk feeding frequency for non-breastfed children 6–23 months	MMFF	Proportion of children aged 6 – 23 months who were not breastfed but consumed at least two milk feeds in the past 24 hours.	Children aged 6 – 23 months
Minimum acceptable diet 6–23 months	MAD	Proportions of children aged 6 – 23 months who in past 24 hours met composite indicator of optimal age specific frequency of meals and the adequate variety i.e. <ul style="list-style-type: none"> • Breastfed children in the 6 – 23 months age range with adequate minimum dietary diversity and meal frequency in the past 24 hours • Non-breastfed children within 6 – 23 months with adequate minimum dietary 	Children aged 6 – 23 months

		diversity and meal frequency in the past 24 hours in addition to at least two milk feeds.	
Egg and/or flesh food consumption 6–23 months	EFF	Proportion of children aged 6 – 23 months who ate at least an egg and or flesh foods in the past 24 hours.	Children aged 6 – 23 months
Sweet beverage consumption 6–23 months	SwB	Proportion of children aged 6 – 23 months who consumed a sweet beverage in the past 24 hours.	Children aged 6 – 23 months
Unhealthy food consumption 6–23 months	UFC	Proportion of children aged 6 – 23 months who consumed unhealthy foods that were also high in sodium in the past 24 hours.	Children aged 6 – 23 months
Zero vegetable or fruit consumption 6–23 months	ZVF	Proportion of children aged 6 – 23 months who were not fed and vegetable or fruit in the past 24 hours.	Children aged 6 – 23 months
<i>Others</i>			
Bottle feeding 0 – 23 months	BoF	Proportion of children aged 6 – 23 months who fed from a bottle with a nipple in the past 24 hours.	Children aged 0 – 23 months
Infant feeding area graphs	AG	Proportion of infants aged 0 – 5 months who in past 24 hours consumed exclusively breast milk exclusively, breast milk and non-milk liquids, breast milk and complementary foods, breastmilk and water only, and not breastfed during the previous day.	Infants 0 – 5 months of age

APPENDIX B: Quantitative Questionnaire (English)

Information about survey questionnaire

Task	Date	Time start	Time end	Responsible	Remark
Survey					
Data entry					
Data entry confirmation					

Information about household

Item	Name	ID
Interviewer		
Adjumani		
Village		
Cohort		
Household ID		
Mother		
Baby		

When the survey is done, please remove this first page and keep it where it belongs to ensure the anonymity of the household.

Section 1: SOCIODEMOGRAPHIC CHARACTERISTICS

Instruction: circle the responses from the given option and write if any other idea or answer is given.

No.	Questions	Response	Remark
101	Age		
102	Maternal Height		
103	MUAC		
104	What is your main occupation?	0. Housewife 1. Farmer 2. Office employee (government or non-government) 3. Others_____	
105	What is your highest educational level?	0. Illiterate 1. Informal education 2. Lower primary 3. Upper primary 4. O' level 5. A' level 6. Tertiary institute level	
106	Who is the head of your household?	0. Father 1. Mother (yourself) 2. Other (specify) _____	
107	How many individuals live in your house permanently? (family size)		
108	What is your religion?		
109	Does your household own agricultural land?	0. Yes 1. No	
110	What is the size of your land? (add unit)		
111	Does your household have any animals?	0. Yes 1. No	
112	What types and how many animals? (Put numbers after each animal)	0. Cow/Ox 1. Goat 2. Sheep 3. Hen 4. Others_____	
113	What is the main source of your drinking water?	0. Borehole 1. Spring/protected wells	

		<ul style="list-style-type: none"> 2. Rainwater 3. Public tap water 4. Rivers and lakes 5. I don't know 	
114	How long is the walk to the water source?		
114a	Who is in charge of fetching water?	<ul style="list-style-type: none"> 0. Mother 1. Father 2. Daughter/son 3. Other (specify)_____ 	
114b	What sanitation facility do you have?	<ul style="list-style-type: none"> 0. Ventilated Improved Pit latrine 1. Permanent Latrine 2. Temporary Latrine 3. Communal latrine 4. None 5. Other (specify) 	
115	If latrines, do you share it with other households?	<ul style="list-style-type: none"> 0. Yes 1. No 	
116	If yes, with how many other households do you share the latrine?		
117	How old were you when you first gave birth?		
118	How many living children do you have?		
119	For this last pregnancy, how many antenatal visits have you attended?		
120	For this last birth, where did you deliver?	<ul style="list-style-type: none"> 0. Hospital 1. Local public health center 2. Private health center 3. Home 4. Other (specify)_____ 	
121	For this last birth, how many postnatal checks have you gone to?		
122	For this last birth, how big was your baby?	<ul style="list-style-type: none"> 0. Very small 1. Smaller than average 2. Average 3. Larger than average 4. Very large 5. Don't know 	

123	Has your last child had diarrhea recently?	<ul style="list-style-type: none"> 0. No 1. Yes, in the last 24 hours 2. Yes, in the last 2 weeks 3. I don't know 	
124	Has your last child had cough recently?	<ul style="list-style-type: none"> 0. No 1. Yes, in the last 24 hours 2. Yes, in the last 2 weeks 3. I don't know 	
125	Has your last child had fever recently?	<ul style="list-style-type: none"> 0. No 1. Yes, in the last 24 hours 2. Yes, in the last 2 weeks 3. I don't know 	
126	For the last week, how many times have you listened to the radio?	<ul style="list-style-type: none"> 0. I have not listened to the radio 1. Once or twice 2. Almost every day 	
127	For the last week, how many times have you read the newspaper?	<ul style="list-style-type: none"> 0. I have not read the newspaper 1. Once or twice 2. Almost every day 	
128	For the last week, how many times have you watched the TV?	<ul style="list-style-type: none"> 0. I have not watched the TV 1. Once or twice 2. Almost every day 	
129	Do your household own any of these items?	<ul style="list-style-type: none"> 0. Cellphone 1. Bicycle 2. Lantern/flashlight 3. Radio 4. Motorcycle 5. Ox cart 	
130 a.	How many rooms do you have in your house?		
130 b.	How many huts do you have?		
131	What is your floor made of?	<ul style="list-style-type: none"> 0. Mud 1. Cement 2. Wood 3. Cow dung smear 4. Other 	
132	What type of house do you live in?	<ul style="list-style-type: none"> 0. Wooden house 1. Mud house 2. Brick house 3. Temporary shelter (plastic sheets) 4. Other 	
133	How long have you been in the West Nile region?	<ul style="list-style-type: none"> 0. \leq 1 year 1. 2 years 	

		2. 3 years 3. 4 years 4. ≥ 5years	
134	Which organizations have you interacted with regarding health?	0. Never 1. Local community organization 2. Non-Governmental Organization 3. Government Agency 4. UNHCR or UN agency 5. Other specify.....	
135	Which organizations have you interacted with regarding water, sanitation and hygiene?	0. Never 1. Local community organization 2. Non-Governmental Organization 3. Government Agency 4. UNHCR or UN agency 5. Other specify.....	
136	Which organizations have you interacted with regarding food and nutrition?	0. Never 1. Local community organization 2. Non-Governmental Organization 3. Government Agency 4. UNHCR or UN agency 5. Other specify.....	
137	From question 132-134, How long have you been exposed to these programs. Health Sanitation Nutrition	Write years of engagement here 	

SECTION 2: Household Food Insecurity Access Scale (HFIAS)

Instruction: circle the responses from the given option.

No	Questions	Response	Code
201	In the past four weeks, did you worry that your household would not have enough food?	0. = No (skip to 203) 1. =Yes	
202	How often did this happen?	0. = Rarely (once or twice in the	

		<p>past four weeks)</p> <ol style="list-style-type: none"> 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks) 	
203	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	<ol style="list-style-type: none"> 0. = No (skip to 205) 1. =Yes 	
204	How often did this happen?	<ol style="list-style-type: none"> 0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks) 	
205	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	<ol style="list-style-type: none"> 0. = No (skip to 207) 1. =Yes 	
206	How often did this happen?	<ol style="list-style-type: none"> 0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks) 	
207	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	<ol style="list-style-type: none"> 0. = No (skip to 209) 1. =Yes 	
208	How often did this happen?	<ol style="list-style-type: none"> 0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks) 	

209	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0. = No (skip to 211) 1. =Yes	
210	How often did this happen?	0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks)	
211	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0. = No (skip to 213) 1. =Yes	
212	How often did this happen?	0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks)	
213	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0. = No (skip to 215) 1. =Yes	
214	How often did this happen?	0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks)	
215	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0. = No (skip to 217) 1. =Yes	
216	How often did this happen?	0. = Rarely (once or twice in the past four weeks)	

		1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks)	
217	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0. = No 1. = Yes	
218	How often did this happen?	0. = Rarely (once or twice in the past four weeks) 1. = Sometimes (three to ten times in the past four weeks) 2. = Often (more than ten times in the past four weeks)	
219	How long did last year's maize production last?		

SECTION 3: COMPLEMENTARY FEEDING KNOWLEDGE

Instruction: circle the responses from the given option.

No	Questions	Response	Code
301F	Where did you receive information about complementary feeding? (Circle all that apply)	0. Health/community workers 1. Family members 2. Media 3. Other 4. Friends 5. Nowhere	
302F	Other than breastmilk, what infants should be given during the first 6 months?	0. Hot water 1. Sugary water 2. Nothing, breastmilk only 3. Soft foods 4. I don't know	
303F	When should breastfeeding stop?	0. 6 months 1. 12 months (1 year) 2. 18 months (1 year and half) 3. 2 years or more 4. I don't know	

304F	At what age should an infant be introduced to complementary feeding?	0. < 4 months 1. 4 - 6 months 2. 6-8 months 3. > 8 months 4. I don't know	
305F	Should a child be looked at in the eyes during feeding?	0. Yes 1. No	
306F	Should a child be forced to finish the plate when you feed him/her?	0. Yes 1. No	
307F	Should a child be talked to when you feed him/her?	0. Yes 1. No	
308F	Should a child be rushed to eat fast during feeding?	0. Yes 1. No	
309F	What should a 6 months old child be feed?	0. Soft foods (mashed or puree) 1. Semi-solid foods (watery rice) 2. Family foods 3. I don't know	
310F	How many times a week does an infant need to consume meat, poultry, and/or fish?	0. Once a week 1. Three times a week 2. Every day 3. They can't eat these	
311F	How many times a week does an infant need to consume eggs?	0. Once a week 1. Three times a week 2. Every day 3. They can't eat these	
312F	How often should a more than 6 months child be fed in a day?	0. Once 1. 2 – 3 times 2. 4 – 5 times 3. I don't know	
313F	How often should a more than 9 months child be fed in a day?	0. 2 times 1. 3 – 4 times 2. 5 – 6 times 3. I don't know	
314F	When can a child eat family foods without modification?	0. 6 months 1. 12 months 2. 18 months 3. I don't know	

SECTION 4: COMPLEMENTARY FEEDING PRACTICES

Instruction: Ask the following questions to the mother (or the caregiver) about their child aged 6-23 months. All of the questions relate to that child.

No	Questions	Response	Code
401a	<p>What is his/her birthday?</p> <p>If the respondent does not know the exact birthdate, ask: Does he/she have a health/vaccination card with the birthdate recorded? If the health/vaccination card/official document is shown and the respondent confirms the information is correct, record the date of birth as documented on the card. Also, record the birthweight if indicated.</p>		
401b	What is the sex of the child?	<p>0. Male</p> <p>1. Female</p>	
402	How many months old is your child?		
403	Check consistency (calendar of events, birth card)		
404	Was your child breastfed yesterday during the day or at night?		
405a	<p>Next, I would like to ask you about some liquids that your child may have had yesterday during the day or at night. Did he/she have any...:</p> <p>Plain water?</p>	<p>0. Yes</p> <p>1. No</p>	
405b	Infant formula such as NAN1, NAN2, Nutricia, Gallia, etc.?	<p>0. Yes</p> <p>1. No</p>	
405c	Milk such as tinned, powdered, or fresh animal milk?	<p>0. Yes</p> <p>1. No</p>	
405d	Juice or juice drinks?	<p>0. Yes</p> <p>1. No</p>	

405e	Clear broth?	0. Yes 1. No	
405f	Yogurt?	0. Yes 1. No	
405g	Thin porridge?	0. Yes 1. No	
405h	Any other liquids? (specify)	0. Yes 1. No	
406	<p>Please describe everything that your child ate yesterday during the day or night, whether at home or outside the home. For each meal, put bullet points.</p> <p>Think about when (NAME) first woke up yesterday. Did (NAME) eat anything at that time? If yes: Please tell me everything (NAME) ate at that time. Probe: Anything else? Until respondent says nothing else. If no, continue to Question b).</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <p>b) What did he/she do after that? Did he/she eat anything at that time?</p>		

If yes: Please tell me everything he/she ate at that time. Probe: Anything else? Until respondent says nothing else.

Repeat question b) above until respondent says the child went to sleep until the next day.

If respondent mentions mixed dishes like a porridge, sauce or stew, probe:

	<p>c) What ingredients were in that (MIXED DISH)? Probe: Anything else? Until respondent says nothing else.</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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SECTION 9: FATHER’S INVOLVEMENT IN CHILDCARE

Instruction: circle the responses from the given options.

How often does your husband/partner...?

No	Questions	Response	Code
901	Contribute money to support the child regularly, paying for food	0. Never 1. Sometimes 2. Almost always	
902	Take the child to healthcare center since his/her birth, alone or with you	0. Never 1. Sometimes 2. Almost always	
903	Play and talk with the child daily	0. Never 1. Sometimes 2. Almost always	

904	Feed and take care of the child almost daily	0. Never 1. Sometimes 2. Almost always	
905	Hold and carry the child daily	0. Never 1. Sometimes 2. Almost always	
905	Teach things to the child	0. Never 1. Sometimes 2. Almost always	
906	Take care of the child when you are busy	0. Never 1. Sometimes 2. Almost always	
907	Advice you on matters regarding the child	0. Never 1. Sometimes 2. Almost always	

SECTION 11: SOCIAL SUPPORT

Instruction: circle the responses from the given options.

No	Questions	Response	Code
1101	Who generally supports you the most in your life?	0. No one 1. Mother or mother-in-law 2. Husband 3. Siblings 4. Friend 5. Other (specify):	
1102	I visit with friends and relatives	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	

1103	I get help around the house	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1104	I get help with money in an emergency	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1105	I get praise for a good job done/completed	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1106	I have people who care what happens to me	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1107	I get much needed love and affection	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1108	I get telephone calls from people I know	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1109	I get people visit to check on me and see if I am fine	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1110	I get chances to talk to someone about problems at work, household, or community	0. Not at all 1. Rarely 2. Somehow	

		3. Mostly 4. As much as I like	
1111	I get chances to talk to someone I trust about my personal problems	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1112	I get chances to talk about money matters	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1113	I get invitations to go out and do things with other people	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1114	I get useful advice about important things in life	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1115	I get help when I needed transportation	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1116	I get help when I am sick in bed	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1117	Do you have anybody you turn to for suggestions about how to deal with a family problem?	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	

1118	I get help with daily chores when I am sick?	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1119	I have someone who I can have a good time with.	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	
1200	Are you involved in any social groups in your community?	0. Yes 1. No	
1201	<i>If yes for 1200</i> Can you mention some of the community social groups that you are involved in?	0. 1. 2. . 3.	
1202	To what extent are you involved in these community social groups	0. Not at all 1. Rarely 2. Somehow 3. Mostly 4. As much as I like	

SECTION 13: CHILD ANTHROPOMETRY

No	Questions	Response	Remarks
2101	What is the child's age? (crosschecking with earlier answer)	
2102	What is the child's MUAC? (Measure for child above 6 months)	0. 1. 2.	
2103	Whats is the child's length? (measure in cm)	3. 4.	

		5.	
2104	Whats is the child's weight? (Measure cm)	0. 1. 2.	

APPENDIX C: Quantitative Questionnaire (Arabic)

استبانة الأمهات في منتصف الخط الثاني

القسم 1: الخصائص الاجتماعية والديمغرافية
التعليمات: دائره الردود من الخيار المعطىs والكتابة إذا أعطيت اي فكره أو أجابه أخرى.

CMSD01	تاريخ اليوم (dd/mm/year)	
CMSD02	جمع البيانات	0. الأساس 1. الخط الأوسط الأول 2. الخط المتوسط الثاني 3. خط النهاية
CMSD03	الأحرف الاستهلاكية لعداد	
CMSD04	رمز المجيب	
CMSD05	اسم التسوية	
CMSD06	اسم القرية	
CMSD07	اسم الام	
CMSD08	اسم الأب	
CMSD09	ما هو عمرك (بالسنوات)؟	
CMSD10	هل كان طفلك الأصغر مصابا بالإسهال مؤخرا؟	0. لا 1. نعم، في الساعات ال 24 الاخيريه 2. نعم، في الأسابيع الاخيريه 2-4 3. لا أعرف
CMSD11	هل كان طفلك الأصغر قد سعال مؤخرا؟	0. لا 1. نعم، في الساعات ال 24 الاخيريه 2. نعم، في الأسابيع الاخيريه 2-4 3. لا أعرف
CMSD12	هل كان طفلك الأصغر مصابا بالحمى مؤخرا؟	0. لا 1. نعم، في الساعات ال 24 الاخيريه 2. نعم، في الأسابيع الاخيريه 2-4 3. لا أعرف

CMSD13	هل حميت مؤخرًا؟	0. لا 1. نعم، في الساعات الـ 24 الاخيره 2. نعم، في الأسابيع الاخيره 2-4 3. لا أعرف
CMSD14	هل كان لديك إسهال مؤخرًا؟	0. لا 1. نعم، في الساعات الـ 24 الاخيره 2. نعم، في الأسابيع الاخيره 2-4 3. لا أعرف
CMSD15	كم عدد زيارات ما بعد الولادة التي قمت بها بعد الولادة؟	
CMSD16	هل تم تحصين طفلك مؤخرًا (الأشهر الثلاثة الماضية)؟	0. لا 1. نعم 2. لا أعرف

القسم 2: المعرفة التكميلية للتغذية
التعليمات: اختر الإجابات من الخيارات المعطية.

CMCK01	أين تلقيت معلومات عن التغذية التكميلية؟ (دائره كل ما ينطبق)	0. العاملون في الصحة/المجتمع 1. افراد الاسره 2. أعضاء مجموعه النظراء 3. وسائل الاعلام 4. اصدقاء 5. مكان 6. غير ذلك (يرجى التحديد) __ :
CMCK02	بخلاف حليب الثدي، ما الذي ينبغي إعطاؤه للرضع خلال الأشهر الستة الاولى؟	0. الماء الساخن/الشاي 1. المياه السكرية 2. لا شيء، حليب الثدي فقط 3. الاطعمه الطرية 4. لا أعرف 5. غير ذلك (يرجى التحديد) __ :
CMCK03	إلى متى يجب إرضاع الطفل؟	0. 6 أشهر 1. سنه واحده 2. سنه ونصف 3. سنتان أو أكثر 4. لا أعرف
CMCK04	في أي سن ينبغي إدخال الرضيع إلى التغذية التكميلية؟	0. اقل من 4 أشهر 1. 4-5 شهرا 2. في ستة أشهر 3. 7-8 شهرا 4. أكثر من 8 أشهر 5. لا أعرف
CMCK05	هل ينبغي ان ينظر إلى الطفل (في العينين) اثناء الرضاعة؟	0. لا 1. نعم
CMCK06	هل يجب إجبار الطفل علي إنهاء الصحن عندما تطعمه؟	0. لا 1. نعم

CMCK07	هل يجب ان يتحدث الطفل عندما تطعمه؟	0. لا 1. نعم
CMCK08	هل يجب الإسراع بتناول الطعام اثناء الرضاعة؟	0. لا 1. نعم
CMCK09	ما الذي يجب ان ياكله طفل عمره 6 أشهر غير حليب الثدي؟ (دائره كل ما ينطبق)	0. الاطعمه الطرية (مهروسه أو عفنه) 1. الاطعمه شبه الصلبة (الأرز المائي) 2. الاطعمه العائلية 3. حليب البقر أو الماعز 4. لا أعرف 5. غير ذلك (يرجى التحديد) _ :
CMCK10	كم مره في الأسبوع لا يحتاج الرضيع للاستهلاك اللحوم والدواجن و/أو الأسماك؟	0. لا يمكنهم أكل هذه 1. مره في الأسبوع 2. ثلاث مرات في الأسبوع 3. كل يوم
CMCK11	كم عدد المرات في الأسبوع التي يحتاج فيها الرضيع إلى استهلاك البيض؟	0. لا يمكنهم أكل هذه 1. مره في الأسبوع 2. ثلاث مرات في الأسبوع 3. كل يوم
CMCK12	كم مره يجب إطعام الطفل الأكبر من 6 أشهر في اليوم؟	0. مره واحده 1. مرتين إلى ثلاث مرات 2. أربع إلى خمس مرات 3. لا أعرف
CMCK13	كم مره يجب إطعام الطفل الأكبر من 9 أشهر في اليوم؟	0. مره واحده 1. مرتين 2. ثلاث إلى أربع مرات 3. خمس إلى ست مرات 4. لا أعرف
CMCK14	متى يمكن للطفل ان ياكل الاطعمه العائلية العادية دون اعداد خاص مثل الطعام الخاص المطبوخ للطفل فقط؟	0. 6 أشهر 1. 12 شهرا 2. 18 شهرا 3. لا أعرف

القسم 3: ممارسات التغذية التكميلية
تعليمات: أسأل الاسنله التالية للام عن طفلها الأصغر.

CMCP01	هل كان طفلك الأصغر يرضع بالأمس؟	0. لا 1. نعم
CMCP02	هل لدي طفلك الأصغر اي شيء ياكله أو يشربه غير حليب الام منذ ولادته؟	0. لا 1. نعم
CMCP03	في الساعات ال 24 الاخيره، هل كان لطفلك الأصغر اي من التالي؟ (دائره كل ما ينطبق).	0. صيغه الرضع مثل NAN1 ، NAN2 ، نوتريشيا ، Gallia ، الخ 1. عصير أو عصير مثل المشروبات 2. المعلبة، مسحوق، أو الحليب الحيواني

		<p>3. المياه 4. اي سوائل أخرى (يرجى التحديد) __ : 5. عصيده 6. اللين 7. الصودا 8. مرق واضح 9. اي شيء غير مدرج في القائمة غير حليب الثدي (يرجى التحديد) __ : 10.</p>
CMCP04	منذ الولادة، هل لدي طفلك الأصغر اي من التالي؟ (دائره كل ما ينطبق).	<p>0. صيغه الرضع مثل NAN1 ، NAN2 ، نوتريشيا ، Gallia ، الخ 1. عصير أو عصير مثل المشروبات 2. المعلبة، مسحوق، أو الحليب الحيواني 3. المياه 4. اي سوائل أخرى (يرجى التحديد) __ : 5. عصيده 6. اللين 7. الصودا 8. مرق واضح 9. اي شيء غير مدرج في القائمة غير حليب الثدي (يرجى التحديد) __ : 10.</p>
CMCP05	في اي سن كان طفلك الأصغر أو لا يشرب اي شيء غير حليب الثدي؟	<p>0. قبل 3 أشهر من العمر 1. قبل 6 أشهر من العمر 2. في عمر 6 أشهر 3. طفلي الأصغر لم يكن لديه سوي حليب الثدي</p>
CMCP06	في اي سن كان طفلك الأصغر ياكل أو لا اي شيء آخر غير حليب الثدي؟	<p>0. قبل 3 أشهر من العمر 1. قبل 6 أشهر من العمر 2. في عمر 6 أشهر 3. طفلي الأصغر كما كان حليب الثدي فقط</p>
CMCP07	وصف عدد المرات التي يتم فيها الرضاعة الطبيعية حالياً؟	<p>0. عفواً 1. كل يوم 2. 1-2 مرات في اليوم 3. عدة مرات في اليوم</p>
CMCP08	يرجى وصف كل ما ياكله طفلك الأصغر بالأمس خلال النهار أو الليل، سواء في المنزل أو خارج المنزل. فكر عندما استيقظت لأول مره بالأمس هل أكل اي شيء في ذلك الوقت؟ (إذا كان الجواب نعم: من فضلك قل لي كل شيء انه/انها أكلت في ذلك الوقت.) اي شيء آخر؟ حتى المدعي عليه لا يقول شيئاً آخر (قائمه من كل وجبه علي سبيل المثال، وجبه الإفطار، وجبه خفيفه منتصف الصباح، والغداء ، الخ)	
CMCP09	إذا ذكر المجيب الاطباق المختلطة مثل العصيدة أو الصلصة أو الحساء، المسبار: ما هي المكونات التي كانت في ذلك (الطبق المختلط) ؟ اي شيء آخر؟ حتى المدعي عليه لا يقول شيئاً آخر	

القسم 4: الدعم الاجتماعي
التعليمات: دائره الاستجابات من الخيارات المعطيه

CMSS01	من الذي يدعمك بشكل عام في حياتك اليومية؟ (دائره كل ما ينطبق) (CMSS03 إذا لم يكن أحد، انتقل إلى)	0. ولا واحد 1. الام أو الام في القانون 2. الزوج 3. الأشقاء 4. اصدقاء 5. غير ذلك (يرجى التحديد) __ :
CMSS02	من الذي يدعمك بشكل عام في حياتك اليومية؟ (أجابه واحده)	0. ولا واحد 1. الام أو الام في القانون 2. الزوج 3. الأشقاء 4. اصدقاء 5. غير ذلك (يرجى التحديد) __ :
CMSS03	انا بزيارة مع الأصدقاء والأقارب	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب
CMSS04	احصل على مساعده في جميع انحاء المنزل	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب
CMSS05	احصل على مساعده بالمال في حاله الطوارئ	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب
CMSS06	انا الحصول على الثناء على عمل جيد القيام به/الانتهاء	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب
CMSS07	لدي أشخاص يهتمون بما يحدث لي	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب
CMSS08	احصل على الحب والموده المطلوبين بشده	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. بقدر ما أحب

CMSS09	احصل على مكالمات هاتفية من أشخاص اعرفهم	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS10	احصل على الناس الذين يزورون والتحقق من لي لمعرفة ما إذا كنت بخير	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS11	احصل على فرص للتحدث مع شخص ما عن مشاكل في العمل أو الاسره أو المجتمع	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS12	احصل على فرص للتحدث مع شخص أثق به في مشاكلي الشخصية	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS13	احصل على فرص للحديث عن المسائل المالية	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS14	احصل على دعوات للخروج والقيام بأشياء مع أشخاص آخرين	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS15	احصل على نصيحة مفيدة حول الأشياء الهامة في الحياة	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS16	احصل على المساعدة عندما احتجت للنقل	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS17	احصل على مساعده (عموما) عندما أكون مريضا في السرير	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS18	هل لديك اي شخص يمكنك اللجوء اليه للحصول على اقتراحات حول كيفية التعامل مع مشكله عائليه؟	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب

CMSS19	احصل على المساعدة في الاعمال اليومية عندما أكون مريضا	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS20	لدي شخص يمكنني الحصول على وقت جيد مع	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS21	هل أنت متورط في اي مجموعات اجتماعيه في مجتمعتك؟	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS22	هل يمكنك ذكر بعض المجموعات الاجتماعية المجتمعية التي تشارك فيها؟	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب
CMSS23	إلى اي مدي تشارك في هذه المجموعات الاجتماعية المجتمعية	0. عفوا 1. نادرا ما 2. احيانا 3. معظم الوقت 4. يقدر ما أحب

القسم 5: الصحة العقلية

التعليمات: الاسئلة التالية عن الصحة العقلية. علي مدي الأسابيع الماضية 2، كم مره كنت قد أزعت من قبل اي من المشاكل التالية؟ خيارات الاجابه للاسئلة التسعة التالية هي: لا على الإطلاق، عدة أيام، أكثر من نصف الأيام، أو تقريبا كل يوم .

CMMH01	القليل من الاهتمام أو المتعة في القيام بالأشياء؟	0. عفوا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH02	الشعور بالاكئاب أو إلياس؟	0. عفوا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH03	المتاعب السقوط أو البقاء نائما، أو النوم أكثر من اللازم؟	0. عفوا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH04	هل تشعر بالتعب أو القليل من الطاقة؟	0. عفوا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم

CMMH05	قله الشهية أو الإفراط في تناول الوجبات؟	0. عفوًا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH06	هل تشعر بالسوء تجاه نفسك أو أنك فشلت في السماح لنفسك أو لعائلتك بالنزول؟	0. عفوًا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH07	مشكله في التركيز على أشياء مثل قراءه الصحيفة أو مشاهده التلفزيون؟	0. عفوًا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH08	التحرك أو التحدث ببطء حتى ان الناس الآخرين قد لاحظت. أو العكس من ذلك لا يهدا لدرجه أنك كنت تتحرك حول أكثر بكثير من المعتاد؟	0. عفوًا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH09	الأفكار التي ستكون أفضل حالا ميةة أو إيذاء نفسك؟ (ملاحظه إلى العداد: إذا اختار المحبب عدة أيام، أكثر من نصف الأيام، أو كل يوم تقريبا، يرجى اتباع بروتوكول البحوث للاحاله للدعم النفساني والاجتماعي.)	0. عفوًا 1. عدة أيام 2. أكثر من نصف الأيام 3. تقريبا كل يوم
CMMH10	ما مدي صعوبة هذه المشاكل جعلها لك للقيام بعملك، والاعتناء بالأشياء في المنزل، أو الحصول على طول مع أشخاص آخرين؟	0. ليس من الصعب على الإطلاق 1. صعب إلى حد ما 2. صعب جدا 3. صعبه للغاية
الاسئلة التالية عن الصدمة إذا وجدت السؤالين التاليين مزعجه وتفضل عدم الاجابه، لا تحتاج إلى الاجابه .		
CMMH11	يرجى الاشاره إلى ما تعتبره أكثر الاحداث إيلا ما أو رعبا التي شهدتها، ان وجدت.	
CMMH12	في ظل حالتك المعيشية الحالية، ما هو اسوا حدث حدث لك ، إذا كان مختلفا عن السابق.	
فيما يلي الاعراض التي يعاني منها الناس في بعض الأحيان بعد تعرضهم لاحداث مؤذيه أو مرعبه في حياتهم. التفكير في اسوا شيء حدث لك من اي وقت مضى، تقرر كم من الاعراض أزعجت لك في الأسبوع الماضي. لكل سؤال، خيارات الاجابه هي: لا علي الإطلاق، قليلا، قليلا جدا، أو للغاية.		
CMMH13	الأفكار المتكررة أو ذكريات الاحداث الأكثر إيلا ما أو مرعبه	0. عفوًا 1. قليل 2. قليلا جدا 3. الغايه
CMMH14	الشعور كما لو ان الحدث يحدث مره أخرى	0. عفوًا 1. قليل

		2. قليلا جدا 3. الغايه
CMMH15	الكوابيس المتكررة	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH16	الشعور بالانفصال أو السحب من الناس	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH17	غير قادر علي الشعور بالعواطف	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH18	الشعور ثاب، والدهشة بسهولة	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH19	صعوبة التركيز	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH20	مشاكل في النوم	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH21	الشعور بالحماية	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH22	الشعور بالتهيج أو نوبات الغضب	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH23	تجنب الانشطه التي تذكرك بالاحداث المؤلمة أو المؤذية	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH24	عدم القدرة على تذكر أجزاء من الاحداث الأكثر إيلاما أو الصادمة	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH25	اهتمام اقل بالانشطه اليومية	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH26	الشعور كما لو لم يكن لديك مستقبل	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه

CMMH27	تجنب الأفكار أو المشاعر المرتبطة بالاحداث المؤلمة أو المؤذية	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH28	رد فعل عاطفي أو بدني مفاجئ عند تذكير الاحداث الأكثر إيلاما أو الصادمة	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH29	الشعور بان لديك مهارات اقل مما كانت عليه قبل	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH30	صعوبة التعامل مع الأوضاع الجديدة	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH31	الشعور بالإرهاق	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH32	الم جسدي	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH33	المضطربة من المشاكل الجسدية	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH34	ذاكره ضعيف	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH35	العثور على من يقال من قبل أشخاص آخرين ان كنت قد فعلت شيئا لا يمكن ان نتذكر	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH36	صعوبة في التفات	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH37	الشعور كما لو كنت تنقسم إلى شخصين واحد منكم يراقب ما يفعله الآخر	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH38	الشعور بعدم القدرة على وضع خطط يومية	.0 عفوًا .1 قليل .2 قليلا جدا .3 الغايه
CMMH39	لوم نفسك على الأشياء التي حدثت	.0 عفوًا .1 قليل

		2. قليلا جدا 3. الغايه
CMMH40	الشعور بالذنب لأنه نجا	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH41	الياس	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH42	الشعور بالخجل من الاحداث المؤذيه أو الصادمه التي حدثت لك	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH43	الشعور بان الناس لا يفهمون ما حدث لك	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH44	الشعور بان الآخرين معاديون لك	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH45	الشعور بأنه ليس لديك أحد للاعتماد عليه	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH46	الشعور بان شخصا وثقت بك خاتك	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH47	الشعور بالاهانه من تجربتك	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH48	الشعور بعدم الثقة في الآخرين	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH49	الشعور بعدم الثقة في الآخرين	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH50	قضاء الوقت في التفكير لماذا حدث لك هذه الاحداث	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه
CMMH51	الشعور بانك الوحيد الذي عانى من هذه الاحداث	0. عفوا 1. قليل 2. قليلا جدا 3. الغايه

CMMH52	الشعور بالحاجة إلى الانتقام	0. عفواً 1. قليل 2. قليلاً جداً 3. الغايه
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القسم 6: المعرفة بالغسل
التعليمات: اختر الإجابات من الخيارات المعطية.

CMWK01	ما هو المصدر الأسلم لمياه الشرب للأطفال؟	0. الأنهار والبحيرات 1. الآبار 2. مياه الأمطار 3. مياه الصنبور العامة 4. لا أعرف
CMWK02	ما الذي ينبغي القيام به قبل إعطاء المياه للأطفال؟	0. شيء 1. تسخينه 2. يغلي 3. أضافه حارس المياه أو غيرها من وكلاء معالجه المياه الامنه 4. لا أعرف
CMWK03	كيف ينبغي تخزين مياه الشرب؟	0. تغطيه 1. غير مشمولة 2. غير مغطاة في منطقه نظيفه 3. لا أعرف
CMWK04	ما الذي يجب تنظيفه قبل إطعام طفلك؟	0. ايدي مقدم الرعاية فقط 1. يدي الرعاية والطفل 2. يدي وأواني الرعاية والطفل 3. شيء 4. لا أعرف
CMWK05	يجب ان تغسل يديك قبل اعداد الطعام؟	0. لا 1. نعم
CMWK06	يجب ان تغسل يديك بعد تنظيف قاع الطفل؟	0. لا 1. نعم
CMWK07	هل يجب ان تغسل يديك بعد التغوط؟	0. لا 1. نعم
ما مدي اهميه هذه البيانات فيما يتعلق بنظافة الأطفال؟		
CMWK08	يحتاج الأطفال إلى مساحة نظيفه لتتبع الزحف	0. ليس مهما 1. مهم إلى حد ما 2. مهم جداً
CMWK09	يجب تجنب الذباب والبعوض في المنزل	0. ليس مهما 1. مهم إلى حد ما 2. مهم جداً
CMWK10	وينبغي عدم الاحتفاظ بالدجاج في المناطق التي يلعب فيها الأطفال	0. ليس مهما 1. مهم إلى حد ما 2. مهم جداً

CMWK11	يجب ان ينام الأطفال تحت ناموسيات السرير	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMWK12	يجب أزاله براز الأطفال بأمان	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMWK13	إذا كانت الاجابه بنعم، كيف ينبغي أزاله براز الأطفال؟	

القسم 7: ممارسات الغسل

تعليمات: مراقبه الشيكات الموضوعية وتحيط علما وفقا لملاحظه (اختيار ما ينطبق).

CMWP01	الام نظيف	0. لا 1. نعم
CMWP02	تنظيف الأطفال	0. لا 1. نعم
CMWP03	حفاضات/تنظيف القاع	0. لا 1. نعم
CMWP04	مجمع نظيف	0. لا 1. نعم
CMWP05	براز الدواجن في المنزل	0. لا 1. نعم
CMWP06	براز الطفل في المنزل	0. لا 1. نعم
CMWP07	المياه واقفه في المناطق المحيطة	0. لا 1. نعم
CMWP08	أواني غير مغسولة	0. لا 1. نعم
CMWP09	مياه الشرب مغطا	0. لا 1. نعم
CMWP10	اجتاحت البيت	0. لا 1. نعم
CMWP11	حاويه القمامة في المنزل	0. لا 1. نعم

القسم 8: المعرفة بتحفيظ الأطفال

التعليمات: اختر الإجابات من الخيارات المعطية. ما مدي اهميه هذه البيانات فيما يتعلق بالأطفال؟

CMDK01	الأمهات بحاجه إلى التحدث مع أطفالهن الرضع	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMDK02	الأمهات بحاجه إلى اللعب مع أطفالهن مره واحده على الأقل في اليوم	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMDK03	تحتاج الأمهات إلى قضاء بعض الوقت في أنشطه التعلم مع أطفالهن الرضع	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMDK04	الآباء بحاجه إلى التحدث مع أطفالهم	0. ليس مهما 1. مهم إلى حد ما

		2. مهم جدا 0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا
CMDK05	الآباء بحاجة إلى اللعب مع أطفالهم مره واحده على الأقل في اليوم	
CMDK06	يحتاج الآباء لقضاء بعض الوقت في أنشطه التعلم مع أطفالهم	0. ليس مهما 1. مهم إلى حد ما 2. مهم جدا

القسم 9: ممارسات تحفيز الأطفال
التعليمات: اختر الإجابات من الخيارات المعطية .

CMDP01	هل فعل طفلك اي شيء في الأسبوع الأخير الذي يسرك كثيرا؟	0. لا 1. نعم
CMDP02	ما الذي فعله طفلك في الأسبوع الماضي والذي يسرك كثيرا؟	
CMDP03	ما هي أنواع الأشياء التي تلعبها مع طفلك؟ الرجاء تحديد كل ما ينطبق.	0. اللعب التي أدلى بها الكبار 1. الكائنات المنزلية 2. مواد من خارج المنزل 3. اللعب التي تجعل الضوضاء 4. ألعاب لبناء الأشياء 5. لعب للتظاهر مثل الدمى 6. آخرون (يرجى التحديد) : __
لكل من الاسئله التاليه، يرجى الاجابه: في الأسبوع الماضي، على كم عدد الأيام التي قام فيها اي شخص بالغ في العائله بما يلي مع طفلك؟ (حدد عدد الأيام)		
CMDP04	اخبار القصص	
CMDP05	أغنى أغنيات	
CMDP06	الذهاب إلى السوق أو المتجر، أو زيارة خارج المنزل	
CMDP07	اللعب	
CMDP08	كيف تعرفين عندما يكون طفلك جائعا؟ (دائره كل ما ينطبق.)	0. صرخات 1. يسال عن الطعام، والنقاط، ويستخدم الإيماءات ولكن لا يبيكي 2. غير ذلك (يرجى التحديد) : __

الباب 10: مشاركة الأب
التعليمات: كم مره يقوم زوجك/شريكك بما يلي؟ خيارات الاجابه هي: أبدا، في بعض الأحيان، دائما تقريبا.

CMFI01	المساهمة بالمال لدعم الطفل بانتظام، ودفع ثمن الطعام	0. أبدا 1. أحيانا 2. دائما تقريبا
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CMFI02	خذ الطفل إلى مركز الرعاية الصحية منذ ولادته، وحده أو مع زوجتك	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI03	اللعب والتحدث مع الطفل يوميا	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI04	أطعم واعتني بالطفل يوميا تقريبا	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI05	عقد وحمل الطفل يوميا	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI06	تعليم الأشياء للطفل	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI07	اعتني بالطفل عندما تكون زوجتك مشغولة	0. ابدا 1. احيانا 2. دائما تقريبا
CMFI08	نصيحة لك بشأن الأمور المتعلقة بالطفل	0. ابدا 1. احيانا 2. دائما تقريبا

الباب 11: نماء الطفل

تعليمات: الاجابه علي كل سؤال عن طفلك أصغر الاستجابة نعم أو لا.

CMCD01	هل يصنع طفلك ممسحة عاليه النبرة؟	0. لا 1. نعم
CMCD02	عند اللعب مع الأصوات، هل طفلك يجعل الشخير، الهدر، أو غيرها من الأصوات العميقة منغم؟	0. لا 1. نعم
CMCD03	إذا اتصلت بطفلك عندما تكون بعيدا عن الأنظار، هل تنتظر في اتجاه صوتك؟	0. لا 1. نعم
CMCD04	عندما تحدث ضوضاء عاليه، هل يتحول طفلك لرؤية من أين جاء الصوت؟	0. لا 1. نعم
CMCD05	هل طفلك يجعل الأصوات مثل "دا"، "ga"، "كا" و "با"؟	0. لا 1. نعم
CMCD06	إذا قمت بنسخ الأصوات التي يصنعها طفلك، هل يعيد طفلك نفس الأصوات اليك؟	0. لا 1. نعم

CMCD07	في حين ان طفلك على ظهره، هل يرفع طفلك ساقه بدرجه كافيه لرؤية قدميه؟	0. لا 1. نعم
CMCD08	عندما يكون طفلك على بطنها، هل يقوم بتصويب الذراعين ودفع صدره كله من السرير أو الأرض؟	0. لا 1. نعم
CMCD09	هل لفه طفلك من ظهره إلى البطن له/لها، والحصول على كل من الذراعين من تحت له/لها/	0. لا 1. نعم
CMCD10	عند وضع طفلك على الأرض، هل هو/هي العجاف على يديه/لها اثناء الجلوس؟ (إذا كان يجلس بالفعل علي التوالي دون ان يميل علي يديها، علامة "نعم")	0. لا 1. نعم
CMCD11	إذا كنت تحمل كلتا اليدين فقط لتحقيق التوازن بين طفلك، فهل يدعم وزنه الخاص اثناء الوقوف؟	0. لا 1. نعم
CMCD12	هل يدخل طفلك في وضعيه الزحف عن طريق الاستيقاظ على يديه وركبته؟	0. لا 1. نعم
CMCD13	هل يقوم طفلك بالإمساك باللعبة التي تقدمها والنظر اليها أو التلويح بها أو مضغها لمدته دقيقه واحده؟	0. لا 1. نعم
CMCD14	هل يمكن لطفلك الوصول إلى لعبه أو فهمها باستخدام كلتا اليدين في ان واحد؟	0. لا 1. نعم
CMCD15	هل يصل طفلك لكسره ويلمسه باصبعه أو يده؟ (إذا كان هو/هي تلتقط بالفعل كائن صغير حجم البازلاء، علامة "نعم")	0. لا 1. نعم
CMCD16	هل يلتقط طفلك لعبه صغيره، ممسكا بها في وسط يدها بأصابعها حوله؟	0. لا 1. نعم
CMCD17	هل يلتقط طفلك الفتات بنجاح باستخدام إبهامه وكل أصابعه في حركه تمشيط، حتى وان لم يكن قادرا على استلامها؟ ... (إذا كان هو/هي تلتقط بالفعل كسره خبز، علامة "نعم")	0. لا 1. نعم
CMCD18	هل يلتقط طفلك لعبه صغيره بيد واحد فقط؟	0. لا 1. نعم
CMCD19	عندما تكون امام مرآه كبيره، هل يبتسم طفلك أو يقوم بنفسه؟	0. لا 1. نعم
CMCD20	هل يتصرف طفلك بشكل مختلف تجاه الغرباء أكثر مما يفعل معك ومع الأشخاص الآخرين المألوفين؟ (ردود الفعل على الغرباء قد تشمل التحديق، العبوس، الانسحاب، أو البكاء)	0. لا 1. نعم
CMCD21	اثناء الاستلقاء على ظهره، هل يلعب طفلك بالإمساك بقدمه؟	0. لا 1. نعم
CMCD22	عندما امام مرآه كبيره، هل طفلك الوصول إلى بات المرآه؟	0. لا 1. نعم

CMCD23	في حين ان طفلك على ظهره/لها، هل هو/هي وضعت له/لها القدم في فمه/لها؟	0. لا 1. نعم
CMCD24	هل يحاول طفلك الحصول على لعبه بعيده المنال؟ (قد لفه، المحور، علي البطن له/لها ، أو الزحف للحصول عليه)	0. لا 1. نعم

القسم 12: الأمهات المجسمات

CMNU01	(مم) 1 MUAC قياس الام	
CMNU02	قياس الام) 2 MUAC مم)	

المادة 13: الطفل المجسم

BCSD01	ما هو تاريخ ميلاد الطفل (dd/mm/year) ؟	
BCSD02	إذا كان المجيب لا يعرف تاريخ الميلاد بالبالضبط، أسأل: هل لديه بطاقة صحية/تطعيم مع تاريخ الميلاد المسجل؟ إذا كانت بطاقة الصحة/التطعيم/الوثيقة الرسمية معروضه وأكد المجيب ان المعلومات صحيحة، فقم بتسجيل تاريخ الميلاد كما هو موثق على البطاقة.	
BCSD03	كم شهرا من عمر طفلك؟ (تحقق من التناسق (تقويم الاحداث، بطاقة الميلاد)	
BCSD04	جنس الطفل	0. ذكر 1. ذكر
BCNU01	قياس ارتفاع (سم) الطفل 1	
BCNU02	قياس طول الطفل (سم) 2	
BCNU03	قياس وزن الطفل (كغ) 1	
BCNU04	قياس وزن الطفل (كغ) 2	
BCNU05	قياس الطفل MUAC (مم) 1	
BCNU06	قياس الطفل MUAC (مم) 2	
BCNU07	هل لدي الطفل اي علامات على الودمه السريرية (التاليب الثنائي)؟	0. لا 1. نعم

APPENDIX D: Quantitative Questionnaire (Dinka)

Thiëc Cilic II Ke Mär Ke Mith

BIÄK TUED 1: KUËN DE CIIND EKOC WÄCIC

Nyooth: golë kä cike lueel kë nyin ku gät nade kək ka wet jöt dë cı bei.

CMSD01	Pëei nin de ye kölë (köl/pëei/ruon)	
CMSD02	Män de kəñic	4. Goc 5. Cilic I 6. Cilic II 7. Thökde
CMSD03	Akeer tueñ ke dukuën	
CMSD04	Nyin de ran bër ye	
CMSD05	Rin ke të ceñ/kemdu	
CMSD06	Rin ke bai	
CMSD07	Rin kemoor	
CMSD08	Rin kewuur	
CMSD09	Run ku ye kädë (në run)?	
CMSD10	Nəñ menh dun kor cı nañ yäc/adhöric në ke nin kë yiic?	4. Aliu 5. Atə, në thee cilo kethierou kuñuan 6. Atə,në wiikiic cilo kerou lo nəñuan 7. Acä nyic/akuoc
CMSD11	Nəñ menh dun kor cı nañ yəl në ke nin kë yiic?	4. Aliu 5. Atə, në thee cilo kethierou kuñuan 6. Atə,në wiikiic cilo kerou lo nəñuan 7. Acä nyic/akuoc

CMSD12	Nəḡ menh dun kor cī naḡ atuɔc/aleth nə ke nīn kē yiic?	4. Aliu 5. Atɔ, nə thee cīlo kethierou kuḡuan 6. Atɔ,nə wiikiic cīlo kerou lɔ nəḡuan 7. Acä nyic/akuɔc
CMSD13	Nəḡ tē cī yīn kan naḡ aleth/atuɔc nə ke nīn kē yiic?	0. Aliu 1. Atɔ, nə thee cīlo kethierou kuḡuan 2. Atɔ,nə wiikiic cīlo kerou lɔ nəḡuan 3. Acä nyic/akuɔc
CMSD14	Nəḡ tē cī yīn kan naḡ yäc/adhōric nə ke nīn kē yiic?	4. Aliu 5. Atɔ, nə thee cīlo kethierou kuḡuan 6. Atɔ,nə wiikiic cīlo kerou lɔ nəḡuan 7. Acä nyic/akuɔc
CMSD15	Ye nem pan akīm nadē tē cīn dhiēth?	
CMSD16	Cī menh du kan wum nə wel de gēel (nə pei cīlo ke diak yiic)?	3. Aliu 4. Atɔ, 5. Acä nyic/akuɔc

BIÄK DE2: NYĪNY DE CIĒM DE MĪTH:

Nyooth: kuany jop nə kekä lɔc keci ke bei kē yiic.

CMCK01	Ye tēno ye yīnWēl ke ciēm de mīth yök thīn?(Gol kē ye rɔt loi ēben nyin)	7. Pial de guɔp/kɔc ke luɔɔi nə akutnhomyic 8. Kɔc biyic 9. Akutnom de kɔcriēc 10. Dhəl yenē kɔc wēl jöt yök 11. Meth 12. Acintē de 13. kɔk (cielēke): _____
CMCK02	Kɔk wär ciek kethīn, ye ke yien mīthkor yadi nə pei tueḡ kedhetēm yiic?	6. Piu tuc/cäi 7. Piu ke thukar 8. Acīn kēdē, aye ciek ke thīn nyīn 9. Cäm kɔcköu 10. Akuɔc/ acä nyic 11. kɔk (cieleke): _____

CMCK03	Lëu meth bī thuat në pei kedë?	<ul style="list-style-type: none"> 5. Pei kedhetëm 6. Ruon tøk 7. Ruon tøk ku nhuth/biäk 8. Run kerou lə tueŋ 9. Akuoc/ acä nyic
CMCK04	Ye run kedie yenë ke menhkor nyuoth cäm de cuin?	<ul style="list-style-type: none"> 6. Akor awer pei keŋuan 7. Duan lə në pei kedhiec 8. Pei kedhetëm yiic 9. Dhorou lə në pei kebet 10. Adit awär pei kebet 11. Akuoc/ acä nyic
CMCK05	Nadë ke meth tŋ/ŋëm (në ye nyiin) të ciemë ye?	<ul style="list-style-type: none"> 0. Aliu 1. Atə,
CMCK06	Nadë ke meth ŋam abī thän thön të ciem yin yeen?	<ul style="list-style-type: none"> 0. Aliu 1. Atə,
CMCK07	Nadë ke yī lə ke yī jiem meth ke cäämë?	<ul style="list-style-type: none"> 0. Aliu 1. Atə,
CMCK08	Nadë ke meth ləc rət arëet të ciemë ye?	<ul style="list-style-type: none"> 0. Aliu 1. Atə,
CMCK09	Yeŋö nadë ke ciem menh nəŋ pei kedhetëm awer ciek ke thün? (gol kë ye rət loi ëben nyin)	<ul style="list-style-type: none"> 6. Cuin/cäm kəkou (cī liäp ka ye ye nyin) 7. Cuin/ cäm rilkou amäth (ruth de piu) 8. Cäm/ cuin de kəc biyic 9. Ciek ke weŋ ka ciek kethök 10. Akuoc acä nyic 11. kək (cieleke): _____
CMCK10	Ye nadë në wikkic ye meth ye kər bī cuet, në riinŋ ka ajith ka rəc?	<ul style="list-style-type: none"> 4. Ace ke kəkë ye cam 5. Na tøk në wikic 6. Na diäk në wikic 7. Në költhok ëben
CMCK11	Ye nadë në wikkic ye mīth tuəŋ kər bī cam?	<ul style="list-style-type: none"> 4. Ace ke kəkë ye cam 5. Na tøk në wikic 6. Na diäk në wikic 7. Në költhok ëben
CMCK12	Nadë në nyindhia ye menh cī pei kedhetem wuor cam në aköl tøk yic?	<ul style="list-style-type: none"> 4. Na tøk 5. Na rou 6. Diäk le thee keŋuan 7. Dhiəc le thee kedhetëm 8. Akuoc/acä nyic

CMCK13	Nadë në nyindhia ye menh ci pei kedhoŋuan wuor cam në aköl tök yic?	<ol style="list-style-type: none"> 5. Na tök 6. Na rou 7. Diäk le thee keŋuan 8. Dhiεc le theε kedhetëm 9. Akuoc/acä nyic
CMCK14	Ye na ye meth cam në cuin cem koc baai ke cin yic cuin ci luoi yen, yen meth?	<ol style="list-style-type: none"> 4. Pei kedhetem 5. Pei kethier kurou 6. Peike thier kubet 7. Akuoc/acä nyic

BIÄK DE 3: NYÏNY DE DHOL YENË KE MÏTH PIÖC NË CÄM:

Nyooth: Thiec ke thiec kë ënõŋ man meth në biäk de menh kor.

CMCP01	Në menh thin du ci thuat wän aköl?	<ol style="list-style-type: none"> 0. Aliu 1. Atõ,
CMCP02	Nõŋ menh thin du kë ciem ka kë dek koc cie ciek ke thin yon dhiethë ye?	<ol style="list-style-type: none"> 0. Aliu 1. Atõ,
CMCP03	Në thee cilõ ke thier rou ku ŋuan, nõŋ të ci menh thin du ke ka kë yök? (Gol kë ye rõt loi ëben nyin).	<ol style="list-style-type: none"> 0. Mieth de meth ci liäp kä cit NAN1, NAN2, Nutricia, Gallia, agut koc. 1. Piu ci ŋoc ka koc ye dek. 2. Ciek ke anyar/ ka ciek ke kooth 3. piu 4. cõk de kä kocõth (kõk): _____ 5. Dhiadh/madida 6. Ciek ci wac 7. thoda 8. Mieth amat nom nõŋic riŋ, rec, welõk ku piu ci tuoc. 9. Kä liu këne ke gät piny koc cie ciek ke thin (luel ke): _____
CMCP04	Në thee ëke dhieth yin, nõŋ të ci menhdun kor kan naŋ ke kä kë? (Gol kë ye rõt loi ëben nyin).	<ol style="list-style-type: none"> 0. Mieth de meth ci liäp kä cit NAN1, NAN2, Nutricia, Gallia, agut koc. 1. Piu ci ŋoc ka koc ye dek.

		<ol style="list-style-type: none"> 2. Ciek ke anyar/ ka ciek ke kooth 3. pïu 4. Cɔk de kä kɔckɔth (kɔk): _____ 5. Dhiädh/madida 6. Ciek cï wac 7. Thoda 8. Mieth amat nom nɔɟic riŋ, rɛc, wɛlɔk ku pïu cï tuɔc. 9. Kä liu kënë ke gät piny kɔk cie ciek ke thin (luel _____ ke): _____
CMCP05	Ye mɛnhdun kor dek në kɔk cie ciek ke thin të cen naŋ run ke dë?	<ol style="list-style-type: none"> 0. Ke pei ke diäk ɟoot. 1. Ke pei kedhetem ɟoot. 2. Në pei kedhetem yiic. 3. Mɛnh diën kor anɔɟ ciek ke thin.
CMCP06	Ye mɛnhdun kor cam në kɔk cie ciek ke thin të cen naŋ run ke dë?	<ol style="list-style-type: none"> 0. Ke pei ke diäk ɟoot. 1. Ke pei kedhetem ɟoot. 2. Në pei kedhetem yiic. 3. Mɛnh diën kor anɔɟ ciek ke thin.
CMCP07	Luel ye nadë ye yïn thuëët?	<ol style="list-style-type: none"> 0. Ce ke kedhia 1. Ębën në aköl kɔk. 2. Tök le në theε kerou në költök 3. Ne theε juëc në aköltök.
CMCP08	Yïn nyuɔɔthë këriëc ëbën cï mɛnhkor du cam wän aköl ka wakou, ciem bai ka të de ce bai. Tak ye na ë kɔn yen rɔt jɔt wän. Nɔɟ kë cï cam në ye thaarë? (Na to: ke lëk kë ya këriëc ëbën ye cam në tharë.) (Detic: Nɔɟ de? agut bi raan thiëc ye lueel ye ka cïn dɛ. (Gätë kë ye cam ëbën piny, cï käk, cäm tueŋ de miäkdur, cäm de akol cielic, cäm thin ye dac cam miäkdur, patuur, agut kɔk.)	
CMCP09	Na luel raan thiëc ye then aliäp cï men de madida/dhädh, milääk, detic ye kë aŋɔc yïn de to	

	(THEN CĪ LIÄÄPIC)? Detic: Nəŋ də? Agut bi raan thięc ye lueel ye ka cĭn də.	
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BIÄK DE 4: KONY DE CED

Nyooth: Gol jop/aduknhĭim nyĭn nə ke kă loc ke cĭke bei kĕ yiic.

CMSS01	Yeŋa yĭ kuony nə kerĭęc ĕben de piir nəke ka akölkĕ? (Gol kĕ ye röt loi ĕben nyĭn). (Na cĭn tök, ke lir lə, CMSS03).	6. Acin tök 7. Mama ka dhiop 8. monydu 9. mĭth akęc ku 10. meth ku 11. kockök (luelke): _____
CMSS02	Yeŋa yĭ kuony nə kă juęc ke piir de ka akölkĕ? (dhuk nə tök)	6. Acintök 7. Mama ka dhiop 8. monydu 9. mĭth akęc ku 10. methku 11. kockök (luelke): _____
CMSS03	ŷen nə nem wuonĕ meth cĭe ku koc ruäi kenĕ ya	5. Acĭe ke kedhia 6. Ace akölrĭęc 7. Nĕ thee kök 8. Nĕ thee juęc 9. Cĭe kər kaar an ee
CMSS04	ŷen ye raandĕ yök bi cäm diĕ luoi ŷeen tĕ cän elĕu nə luoi nə ŷen.	5. Acĭe ke kedhia 6. Ace akölrĭęc 7. Nĕ thee kök 8. Nĕtheejuęc 9. Cĭekorkaar an ee
CMSS05	ŷen ye wĕl pieth yök na naŋ kănuĕn ka riäk.	5. Acĭekekedhia 6. Ace akölrĭęc 7. Nĕ thee kök 8. Nĕ thee juęc 9. Cĭe kər kaar an ee
CMSS06	ŷen ye tĕläu yök bän ya jam wonĕ raaan ye ŷa piĕŋ kănuĕn ciĕ.	5. Acĭe ke kedhia 6. Ace akölrĭęc 7. Nĕtheekök 8. Nĕtheejuęc 9. Cĭe kər kaar an ee
CMSS07	ŷen de koc na naŋ kĕloi röt ke ka kăęc nə ŷa.	5. Acĭe ke kedhia

		6. .Ace akölrüec 7. Nêthækøk 8. Nêthæjuëc 9. Cie kør kaar an ee
CMSS08	Yen ye nhiër kuotic yök ku bän ya nhier.	5. Aciekedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nê thæ juëc 9. Cie kør kaar an ee
CMSS09	Yen ye cot de tälupun yök tönöj kóc nyiee ke.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nê thæ juëc 9. Cie kør kaar an ee
CMSS10	Yen ye kocyök kóc ye ya nem ku guik kë ya bike ya nêem nan pial yen guop.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nêthæjuëc 9. Ciekorkaar an ee
CMSS11	Yen ye tē läu yök bän jam wönë ran tøk nê käwäc röt nê luoi yic, baai ka nê akutnom de kóc yic.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nêthæjuëc 9. Cie kør kaar an ee
CMSS12	Yen ye tē läu yök bän jam wönë ran tönj riëu nê biäk de käwäc röt cië.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nê thæ juëc 9. Cie kør kaar an ee
CMSS13	Yen ye tē läu yök bän jam wönë ran ye yen röt geei ye ya piñ.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nê thæ juëc 9. Cie kør kaar an ee
CMSS14	Yen ye lëk yök bi ya kony nê adöt de käjuëc ye yen ke tæek thin.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nêthæjuëc 9. Cie kør kaar an ee
CMSS15	Yen ci wet thiekic yök nê biäk de käriliic nê piiric.	5. Acie ke kedhiah 6. Ace akölrüec 7. Nê thæ køk 8. Nê thæ juëc 9. Cie kør kaar an ee
CMSS16	Yen ye kuony yök tē kar yen cäth.	5. Acie ke kedhiah

		6. Ace akölrüec 7. Nê thee kək 8. Nê thee juēc 9. Cie kər kaar an ee
CMSS17	Ẅen ye kuony yök (de kəriec/käj ke dhia) të cï yen tuany/bec atääc agenic.	5. Acie ke kedhia 6. Ace akölrüec 7. Nê thee kək 8. Nê thee juēc 9. Cie kər kaar an ee
CMSS18	Nəŋ ran de ye wel rət nê tāj de të bï luəi kē nuən baai?	5. Acie ke kedhia 6. Ace akölrüec 7. Nê thee kək 8. Nê thee juēc 9. Cie kər kaar an ee
CMSS19	Ẅen ye kuony yök nê akölrüec de luəi ke ƣa tuany.	5. Acie ke kedhia 6. Ace akölrüec 7. Nê thee kək 8. Nê thee juēc 9. Ciekərkaar an ee
CMSS20	Ẅen de raan tōŋ ye wə naŋ theer pieth wə ye.	5. Aciekedhia 6. Ace akölrüec 7. Nêtheekək 8. Nêtheejuēc 9. Cie kər kaar an ee
CMSS21	De të cïn met nê ceŋ ke akuut nê akutnom duənic?	5. Aliu 6. Atə
CMSS22	Luelkəkkeakutnom de ceŋ ka akuutcinkelothin?	5. Acie ke kedhia 6. Ace akolriec 7. Nê thee kək 8. Nêtheejuēc 9. Cie kər kaar an ee
CMSS23	Ca lothïn wudië wenë ceŋ ke akuut ke akutnom kënë?	5. Acie ke kedhia 6. Ace akölrüec 7. Nê thee kək 8. Nê thee juēc 9. Cie kər kaar an ee
CMSS24	Ẅen ye të läu yök bän naŋ raan ye ƣa kony nê kă ye ƣa liäp nom cək bath.	0. Acie ke kedhia 1. Ace akölrüec 2. Nê thee kək 3. Nê thee juēc 4. Cie kər kaar an ee

BIÄK DE 5: PIAL DE NHOM

Nyooth: Thiéc bə ajam nə pial de nhom. Nə wiik kerou tueŋ c̄ilə, Na nə kōöl thök eben c̄in kan naŋ anuaan de kekā nuenkē? Ka bī ke mæk kethiəc bə kedhoŋuan ak̄e: ace ke kedhia, nə aköl juēc, adit e ka wər biäk de aköltök, ka thiək nə akölr̄iēc.

CMMH01	Kuur de piou de kekər ka miet de piou nə luoci de k̄aŋ yiic?	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH02	Ba tə ke yī c̄in ŋəth?	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH03	Ba yuik nə anuanic, ka ba ya rēer ke yin nok, ka ba nin arēet?	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH04	Dāŋ de guop ka ba naŋ rier thin kor?	4. Ace ke kedhia 5. Nəaköljuēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH05	Ba piou ciən cām ka ba cam arēet?	4. Ace kekedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH06	Ba rət yök ke yin rac ka ba rət cək niop ka panduon nə ya?	4. Ace kekedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH07	Ba ya tə ajääkic nə nyindhia ka ba ya kuen nə wər aget ka dai de TV?	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH08	Cääth ka ba jam amäth ago kəc kək nyic.ka wuoc de ba ya cath ke yin cie loŋ/ka ba cie lo loou nə aköl juēc?	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.
CMMH09	Ba ya tak wu ka aŋuen thou ka ba rət nək? (Nyiny de dukuən: Na ca raan thiéc cī loc nə nin juēc wər biäk	4. Ace ke kedhia 5. Nə aköl juēc 6. Adit e ka wər biäk de aköltök 7. Ka thiək nə akölr̄iēc.

	de n̄in, thiok n̄e akolriec, kuany k̄e kor c̄ok n̄e noŋ k̄oc ke akim de kony de k̄oc cie nhim pial).	
CMMH10	Rir yic yed̄e ye anuan cie rot loi n̄e luoi du yic, tiet̄e nyin n̄e k̄a baai ka ba lo tueŋ wen̄e k̄oc k̄ok?	<ol style="list-style-type: none"> 4. Acie yic rir n̄e kaŋ kedhia 5. Arir am̄ath 6. Arir yic ar̄eet 7. Arir yic ar̄eetic
<p>N̄e thioc bo aye k̄a ke rier de nom. Na ye yok ke thioc bo kerou k̄e riak yi piou ku nhia bake cie dhuk nhim, ke du ke dhuk nhim</p>		
CMMH11	Nyuoth̄e k̄e ca gam n̄e k̄a juec ye k̄oc nok ka riec k̄e k̄oc ca kan yok/ka cinke kan tek thin, nanon de ke luel.	
CMMH12	K̄e to n̄e piir duon de ye kole yic, yeŋo r̄ec cie rot loi n̄e noŋ yi n̄e ke thee ke, na weec ke k̄a nhial.	
<p>Ke k̄a k̄e aye cit ye k̄oc ke yok te cik keek tek n̄e karaacic, ka k̄a ye k̄oc riac n̄e piiric. Ba ya tak n̄e k̄e r̄ec ci rot loi enon yin, yi tak wu ke cit k̄e yiki yi diaŋ nom yed̄e n̄e wik cilc yic. N̄e thioc tok yic. Ke jop bi loc ak̄e: ace ke kedhia, akor, akor am̄ath, ar̄eetic.</p>		
CMMH13	Ba ya to ke yi tak ka bi ya to n̄e yi nom ke noŋ k̄e nak k̄oc ka kariec k̄oc ci rot loi.	<ol style="list-style-type: none"> 4. Ace ke kedhia 5. Akor 6. Akor am̄ath 7. Ar̄eetic
CMMH14	Ba ya yok n̄e yi guop cit k̄e noŋk̄e bi rot be rloi.	<ol style="list-style-type: none"> 4. Ace ke kedhia 5. Akor 6. Akor am̄ath 7. Ar̄eetic
CMMH15	Ba ya to ke yi nyuoth ke noŋ rioc ka k̄e ci pieth.	<ol style="list-style-type: none"> 4. Ace ke kedhia 5. Akor 6. Akor am̄ath 7. Ar̄eetic
CMMH16	Ba ya yok n̄e yi guop ci k̄e noŋ k̄e cie nyaai ka peek yim we k̄oc	<ol style="list-style-type: none"> 4. Ace ke kedhia 5. Akor 6. Akor am̄ath 7. Ar̄eetic
CMMH17	Ba rot ya yok cit k̄e yin cie ked̄e.	<ol style="list-style-type: none"> 4. Ace ke kedhia 5. Akor

		6. Akor amäth 7. Arëetic
CMMH18	Ba ya yök në yī guop cit kë nõj kë ræc bī röt loi ka kë de gäi.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH19	Ba ya tō në kë racic.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH20	Ba kë rac ya niën.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH21	Ba röt ya yök ke yīn tütë nyin.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH22	Ba röt yök keyī ye piou dac riäk ka ba ya piour në tøj.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH23	Päl ba ya lō në kä wën ye yī cök tak kä wär diir yīin, ka kë ræc eci röt loi.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH24	Ba tek cie ye lëu në biäk de kä juéc ye koc nok ka kä diir koc.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH25	Ba piou ya kuur në kä ye ke loi yic në akölræc.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH26	Ba röt ya yök ke cīn ke lëu de kol de në piiric.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH27	Pæel tæk ka ba röt ya täu në kä ye koc diir yic ka kä ye koc nok.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH28	Pæeu wei në ke cie röt loi ka kä juéc ye röt loi yīke takic ke ke ye koc nok në thæ koc.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH29	Ba röt ya yök ke yīn nõj nyic kor awæer kë dun ètō ke yī.	4. Ace ke kedhia 5. Akor 6. Akor amäth

		7. Arëetic
CMMH30	Ariric, balo we të jöt	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH31	Ba dak	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH32	Tök de guop/ka arëem de guop	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH33	Ba ya rioc në kë loi röt.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH34	Ba cïen adöt de kë loi röt.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH35	Akor ba nyic kë ye koc leek yïn kë ca loi ku cïe ye tak.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH36	Rilic ba röt pän piny.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH37	Ba röt yök ke yïn cïe tæekic në koc kerou ku raan töng de cï röt week adai yenö loi koc koc.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH38	Ye yök në yï guop ke cïn ajuier de köl lëu ba looi	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH39	Ba röt gok në kä cï röt looi	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH40	Ba röt yök ke pïir to yïn thïn acïe pieth.	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic
CMMH41	Cïen noth	4. Ace ke kedhia 5. Akor 6. Akor amäth 7. Arëetic

CMMH42	Ba ya riɔc nə kē nek kɔc ka dierë nə kã ye rot loi ënɔŋ yïn.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH43	Ba rɔt yök ke yïn ye piŋ nə kē ye luel kã ye rɔt loi ënɔŋ yïn.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH44	Ba rɔt yök ke nɔŋ kɔc kɔk maan yïn.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH45	Ba rɔt yök ke cïn raan tɔŋ ye rɔt gëei nə yïn.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH46	Ba rɔt ya yök ke raan tɔŋ nhia ee yïn guel.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH47	Ba yök ke luoi ye dhɔl/ ka yoi ke niɔp	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH48	Ba kɔc kɔk cïe ye gam.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH49	Ba rɔt yök ke yïn cïn rier kony yïn kɔc kɔk.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH50	Ba thaa ya nɔk ke yïn tæk, yeŋö yï ke kã kē rɔt luoi yïn.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH51	Ba rɔt ya yök ke yïn gum ke kã ye rɔt kē yï tök nə ke aköl kē	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic
CMMH52	Ba rɔt ya yök ke yïn kɔr ba guur.	4. Ace ke kedhia 5. Akor 6. Akor amãth 7. Arëetic

BIÄK DE 6: NYÏC DE PÏU, WËK KU PIAL DE GUOP (WASH)

Nyooth: kuany jop/adhuknhïim nə kekã lɔc ke cï ke bei kē yiic.

CMWK01	Yeṇö ye të pieth de pïu ke dëk ke mïth?	<ol style="list-style-type: none"> 5. Wër ku apier 6. Dəŋki 7. Pïu ke deṇ 8. Mathur rəm nə kəc kedhia 9. Akuɔc /acä nyic
CMWK02	Yeṇö nadë ke loi ke mïth kë nə ke kan yien pïu?	<ol style="list-style-type: none"> 5. Acin këdë 6. Məorë ke/tuocë ke kəth 7. Thalke/capë ke 8. Cuatë wəl ke pïu thin ka kək yen nəke pïu dɔc 9. Akuɔc/acänyic
CMWK03	Pïu ke dëk ye ke təu yadë?	<ol style="list-style-type: none"> 4. Kum kenhiim 5. Duonë ke kumnhïim 6. Duonë ke kum nhïim të cï weec 7. Akuɔc/acänyic
CMWK04	Yeṇö nadë ke kən weec ke yï kën menh du kan cääm?	<ol style="list-style-type: none"> 5. E ciin de raan tiët nyin nə meth ye tək 6. Ekë cin ke raan tiët nyin ku meth 7. Ekë cin ke raan tië tnyin ku meth ku aduuk 8. Acin këdë 9. Akuɔc/acänyic
CMWK05	Nadë ke yï wak yï cin ke yï kën cäm/cuïn kan looi?	<ol style="list-style-type: none"> 0. Aliu 1. Atə,
CMWK06	Nadë ke yï wak yï cin ke yï cï meth kan weec thar?	<ol style="list-style-type: none"> 0. Aliu 1. Atə,
CMWK07	Nadë ke yï wak yï cin ke yï cï kan lo peel/rokiç?	<ol style="list-style-type: none"> 0. Aliu 1. Atə,
Thiekic yedë ekënë të thenyë ke wëlkë röt pial de guop de mïth?		
CMWK08	Mïth akəor bi kë ya naṇ të lääu ci weec bi kek ya mol	<ol style="list-style-type: none"> 3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëet
CMWK09	Luaṇ ku dhiëer nadë ke ka bi ke ya gël yöt.	<ol style="list-style-type: none"> 3. Acï yic thiek 4. Athiekic amäth

		5. Athiekic arëët
CMWK10	Ajüith nadë ke ka cī bī ya mac nē yān ye mīth ke pol.	3. Acī yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMWK11	Mīth nadë ke ka ye taac nē ageen cinë ke alamethiei guot nēke nhīm.	3. Acī yic thiek 4. Athiekic amäth 5. Athiekic aëët
CMWK12	Cieth ke mēth nadë ke ka bī ya jat wei apieth	3. Acī yic thiek 4. Athiekic amäth 5. Athieki carëët
CMWK13	Na to, ke nadë ke ciēnh de meth bī ya jat wei yadë?	

BIÄK DE 7: LUOI DE PÜU, WEC KU PIAL DE GUOP (WASH)

Nyooth: ciar tē nōḡ yen acuol ka yān ci röt wuor nē ye guop ku döt ëtë cier yīn yen (kuany kã ye röt loi).

CMWP01	Wec de man meth.	0. Aliu 1. Atō,
CMWP02	Wec de meth.	2. Aliu 3. Atō,
CMWP03	Pämpäth/wec de meth thar.	0. Aliu 1. Atō,
CMWP04	Wec de yoc/geu yic.	2. Aliu 3. Atō,
CMWP05	Wer ke diet ka ajüith yööt.	0. Aliu 1. Atō,
CMWP06	Wer ke mith yööt.	0. Aliu 1. Atō,
CMWP07	Püu kääc/cäp tē thiok ke baai.	0. Aliu 1. Atō,
CMWP08	Apec/aduuk ke cäm kënë ke waak	2. Aliu 3. Atō,
CMWP09	Püu ke dëk cī ke kum nhīm	0. Aliu 1. Atō,
CMWP10	yön cī weecic	0. Aliu 1. Atō,
CMWP11	yān yenë ke cäm cī both baai cuat thin	0. Aliu 1. Atō,

BIÄK DE8: NYÏC DE BÏ NHIAL/WEEI DE METH

Nyooth: kuany jop/adhuknhīm nē ke kã loc ke cī ke bei kē yiic. Thiekic yedë ëkënë tē thenyë ke wël këröt mīth?

CMDK01	Mär ke mïth akɔɔr bï kē ya jam ke nē mïthii ken.	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMDK02	Mär ke mïth akɔɔr bï kē ya pol ke nē mïth ken natök nē köl tök.	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMDK03	Mär ke mïth akɔɔr bï kē ya naŋ theε ye keke mïthi ken piɔc.	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMDK04	Wär ke mïth akɔɔr bï kē ya jam kenē mïthii ken	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMDK05	Wär ke mïth akɔɔr bï kē ya pol kenē mïth ken na tök nē kol tök.	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët
CMDK06	Wär ke mïth akɔɔr bï kē ya naŋ theε ye keke mïthi ken piɔc.	3. Acï yic thiek 4. Athiekic amäth 5. Athiekic arëët

BIÄK D 9: DHOL YE KE METH BEI NHIAL/WEEI:

Nyooth: kuany adhuknom nē ke kä löc ke cï ke bei kē yiic.

CMDP01	Nəŋ kē pieth cï menh du looi nē wik cïlo yic mitë piou arëëtic?	2. Aliu 3. Ato
CMDP02	Yeŋö pieth cï menh du looi nē wik cïlo yic mitë piou arëëtic?	
CMDP03	Ye kē kəŋö tɔ kenē yïin ye menh du ke pol? Kuany kä ye röt loi kedhia.	7. Tiɔp ye kɔcdit ke cuëc. 8. Kä ye ke pol biyic 9. Kä ke pol tɔ biyic baai. 10. Kä ke pol ye wuou loi. 11. Kä ke pol ye ke yik 12. Kä ke pol ye ke tïŋ cï kɔc 13. Kɔk (luel ke): _____
Nē ke thiëc tök kē, yin dhuk ke nhïim: nē wik cïlo yic, ye nin ke dē cï raan dït/ŋuän de kɔc baai ke kä kē luoi menh du? (luel ciin de nin)		
CMDP04	Luel akɔkööł	

CMDP05	Ket diet	
CMDP06	Lor thuuk ka yän ke tou de cäm ka nem baṅ biyic de baai	
CMDP07	Pölë	
CMDP08	Ye nyic wudë nadë ke menh du cĩ cək? (Gol kä ye röt kedhia nyin)	3. Dhiëu 4. Bĩ thiëc në cäm, bĩ nyuuth në ye cin ke cĩe dhiau 5. Kək (luel ke): _____

BIÄK DE 10: TËU YE WUN METH RÖT TÄU:

Nyooth: ye nadĩ ye mony du / ran thiök ke yĩin ke kä kë loi? Kä meek kë ke akë: Acie röt ye looi, e röt loi në theë kək, e röt duor looi në theë kedhia.

CMFI01	Määtë wëu yic bĩ ke meth ya dac kony, bĩ ke cuin/cäm de ya cuat piny thuuk.	3. Acie röt ye looi 4. E röt loi në theë kək 5. E röt duor looi në theë kedhia
CMFI02	Lëerë meth pan dë akim ye tők ka ke man/tĩṅ du.	3. Acie röt ye looi 4. E röt loi në theë kək 5. E röt duor looi në theë kedhia
CMFI03	Pölë ku jam we meth në akəl ëbën.	3. Acie röt ye looi 4. E röt loi në theë kək 5. E röt duor looi në theë kedhia
CMFI04	Cämë ku tiëtë nyin në meth ke ce akəl ëbën.	3. Acie röt ye looi 4. E röt loi në theë kək 5. E röt duor looi në theë kedhia
CMFI05	Dəm ku muk meth në akəl ëbën.	3. Acie röt ye looi 4. E röt loi në theë kək 5. E röt duor looi në theë kedhia
CMFI06	Piocë meth kṅṅ	3. Acie röt ye looi 4. E röt loi në theë kək

		5. E rət duər looi në thee kedhia
CMFI07	Tiëtë nyin në meth të nuen në tik.	3. Acie rət ye looi 4. E rət loi në thee kək 5. E rət duər looi në thee kedhia
CMFI08	Bī yī lek kā theny rət meth.	3. Acie rət ye looi 4. E rət loi në thee kək 5. E rət duər looi në thee kedhia

BIÄK DE 11: YÏK NHIAL DE METH:

Nyooth: dhuk ke thięc tők kē nhïim në biäk de menhdun kor, luel wu atə awu ka aliu.

CMCD01	Ye menh du kieu/cieu loi arëetic?	2. Aliu 3. Atə
CMCD02	Na pol menh du në pol yen në cieu/kieu, ye menhdu röl ka në röl thin cïe piŋ apieth?	0. Aliu 1. Atə
CMCD03	Na cəl menh thin du ke kën yī tōŋ, ye rət wel ë baŋ bī yī röl du thinë?	0. Aliu 1. Atə
CMCD04	Na nōŋ kieu/cieu/wuəu loi rət, ye menh thin du rət wel ë baŋ bī yī röl thinë?	0. Aliu 1. Atə
CMCD05	Ye menh thin du röl cïtë kā kē loi “da”, “ga”, “ka” ku “ba”?	0. Aliu 1. Atə
CMCD06	Na ciëtë röl ye menh thin du loi, ye menh du ŋot ke dhuk yïin ë rölë cï tăn de?	0. Aliu 1. Atə
CMCD07	Në thee ŋotë meth kek ke dhəər piiny, ye menh thin du ye ye kul jat nhial arët bī ye cök tïŋ?	0. Aliu 1. Atə
CMCD08	Na nōŋ menh thin du kē nāk ye yic, ye ye kək nyoth ku gei ye piəu në agen ka piny?	0. Aliu 1. Atə
CMCD09	Ye menh thin du rət leer piny gələ ye kəu agut cï ye yic, abī ye cin bei biyic kedhia?	0. Aliu 1. Atə
CMCD10	Na ca menh thin du kan piny, ye piny thany në ye cin ben rət kony në rëer? (*Na cï rëer lëu	0. Aliu 1. Atə

	ëcök acĭ piny ber thany nē ye cin, jĭt/git “atō”)	
CMCD11	Na dōm cin kedhia ke menh thin du bĭ rōt cōk piny, ye rōt kuōny bĭ kōoc ye tōk?	0. Aliu 1. Atō
CMCD12	Ye menh thin du tē kōor en ben mol gōl, ye löny piny nē ye cin ku ye nhĭol?	0. Aliu 1. Atō
CMCD13	Ye menh thin du kē de pol ca yiēk en dōm ku tiŋ, ruer, ka bĭ nyii nē akuen tōkic?	0. Aliu 1. Atō
CMCD14	Ye menh thin du kē de pol dēr nē cin ke kerou abĭ keŋ na tōk?	0. Aliu 1. Atō
CMCD15	Ye menh thin du theithuei ke cuĭn/kuĭn cĭ lööny piny dēr ku jek keek nē ye riōop ka nē ye cin? (Na cĭ ke kă thii kē jat nhial ke ke cĭt nyiĭn nyin de aguōth, jĭt/git “atō”)	0. Aliu 1. Atō
CMCD16	Ye menh thin du kē thin de pol jōt, ku muk nē ye cin cielic ke cĭ tuōm kōu nē ye cin?	0. Aliu 1. Atō
CMCD17	Ye menh thin du lēu bĭ theithuei ke cuĭn/kuĭn cĭ löny piny jōt nē cin bundit ku nē cin kedhia ke cĭ rōk nē ye cin, na cĭe cak lēu nē jōt nhial? (Na cĭ theithuei jat nhial, git/jit “atō”)	0. Aliu 1. Atō
CMCD18	Ye menh thin du kē de pol löom/jōt nē ciin tōk?	0. Aliu 1. Atō
CMCD19	Na tääuē nē mĭraya dĭt nom tueŋ, ye menh thin du rōt dōl amāth?	0. Aliu 1. Atō
CMCD20	Ye menh thin du wuōc ke kōc kuc keek kă cĭi ke ye luōi yĭ ku kōc kōk nyic keek? (Kă ye ke luōi kōc kuc keek akē: bĭ yoi arēt, bĭ ye nyin nyuen, bĭ dēeny/kat, ka bĭ dhiau.)	0. Aliu 1. Atō
CMCD21	Nē theē tēer en ke piiny, ye menh thin du ye ye cōk dōom nē ye cin?	0. Aliu 1. Atō

CMCD22	Na tääuë në mīraya dīt nom tueŋ, ye menh thin du röt cuot mīraya bī jak në ye cin?	0. Aliu 1. Ato
CMCD23	Në theε teer en ke piiny, ye menh thin du ye ye cök tääu në ye thok?	0. Aliu 1. Ato
CMCD24	Ye menh thin du kä ke pol them bī ke ya kər kä cīe ke dēr? (e ler ka rōc në ye yic ago ke yök)	0. Aliu 1. Ato

BIÄK DE 12: THĒM DE MÄR KE MĪTH:

CMNU01	Thēm de kök de man meth /MUAC them 1 (mm)	
CMNU02	Thēm de kök de man meth /MUAC them 2 (mm)	

BIÄK DE 13: THĒM DE MĪTH:

CCSD01	Meth ë dhiēth na (köl/pei/ruon)?	
CCSD02	Na cīe ran thiēc köl në dhiēthē meth nyic apieth, thiēc: nōŋ meth kat de wum de gēel cīnē köl në dhiēthē meth gāt thīn? Na cī kat de wum nyuoth ku cī lō në ran thiēc nhom men nadē ke kēnē ato tē de, gāt köl në dhiēthē meth cī tăn tō yen në katic.	
CCSD03	Mēnh du nōŋ pei kedē? (ye dōt në költhok ēbēn (calendar of events, birth card)	
CCSD04	Ye menh yīnde	2. Dhuk/moc 3. Nya/tik
CCNU01	Bēr de meth (cm) them1	
CCNU02	Bēr de meth (cm) them2	
CCNU03	Thiēc de meth (kg) them 1	
CCNU04	Thiēc de meth (kg) them 2	
CCNU05	Thēm de kök de meth (MUAC) (mm) them 1	
CCNU06	Thēm de kök de meth (MUAC) (mm) them 1	

CCNU07	De cīt ye meth nyuoth nan cien guop thök (tö nē kem kerou yic)?	0. Aliu 1. Atō
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APPENDIX E: Intervention training modules

Module 1:

Group Dynamics

A group are people who interact with one another and think of themselves as belonging together

Key Messages

- The members of the group have a strong sense of belonging to the group
- The more the group members work and learn together, the greater the influence it would have on the members
- Groups are the biggest part of life
- Most work is done in and with groups
- Knowing how and why groups function or fail to function is a key to success

Peer support groups

Ten to twenty people who meet and interact every two weeks on issues of child and household health, and nutrition. These people have a sense of belonging or oneness

What we need to know of this care group

Its where we interact with other members on health and nutrition issues with expectation about other's behavior

Group guidelines

- It allows the expression of different views.
- Participants listen to understand and gain insight.
- Questions are asked from a position of curiosity.
- Participants speak with free minds.
- New information surfaces
- Respect each other's views
- Give each one a chance to communicate; listen
- No judging
- No criticizing

Know your group leader:

If the selection is done, then introduce the leader to the other members. **(this position is voluntary)**

We need to elect/ select a group leader.

Questions

1. What do you think of the images you see on the charts in the context of our topic?
2. Why are groups important in the community?
3. What are some of the challenges groups face in the community?
4. How can we overcome these challenges?

Module 2:

Antenatal Care

Prompting questions

1. How does going for antenatal care help the mom and baby?
2. What are some reasons mothers do not go for antenatal care?

Key messages

- Mothers should go to the health center as soon as they know they are pregnant.
- Mothers should go to the health center at least eight times while pregnant for antenatal care.

Early initiation of breastfeeding

Prompting questions

1. How soon after birth should mothers breastfeed their baby?
2. Why is breastfeeding right after birth important?

Key messages

- Before mothers deliver, they should tell the health care team that they want to breastfeed immediately after birth.
- Mother should breastfeed the baby within one hour of giving birth.

Module 3:

Postnatal care

Prompting question

1. How often should parents bring their babies to the health center after birth?
2. Why is it important to take your baby to the health center after giving birth?

Key messages

- Go to the health center with your baby at one week, then at two weeks and the six weeks after you give birth.
- Take your baby immediately to a trained health worker or clinic if he/she refuses to eat and is very weak, if he/she is vomiting, or if he/she has diarrhea.

WASH (Mom and household)

Prompting questions

1. How do we know the water is safe to drink?
(Prompt to the need of protecting water because we can't see germs)
2. Why do we need to keep latrines clean and covered?

Key messages

- Keep your drinking water in a clean and covered container, and place in a clean and dry space
- Keep your latrines clean, with no feces around, and covered at all times

Module 4:

Exclusive breast feeding

Prompting questions

1. For how long should a baby be fed ONLY breastmilk?
2. Does breastmilk provide all the baby needs for the first six months of life?

Key messages

- For the first six months, a baby should only receive breastmilk.
- A baby should not have any other foods or liquids, even water before six months old.

Father involvement in breastfeeding

Prompting questions

1. What are ways that fathers can help breastfeeding mothers?
2. Do fathers in your community support breastfeeding mothers?

Key messages

- Fathers can support breastfeeding mothers by helping them with household duties.
- Fathers can support breastfeeding mothers by encouraging and praising mothers for breastfeeding their baby.

Module 5:

Complimentary Feeding practices

Prompting Questions

5. When should children start being given soft foods?
6. What are some of the foods that we can start giving children?

Key message

- When a child is 6 months, start giving soft foods.
- Give a balance of foods at 6 months, and continue breastfeeding up to 2 years

Social Support

Questions

1. Why is it important for us to meet to discuss health and nutrition ?
2. What can we do to ensure that we learn from one another?

Key message

- Caregroup is about working together and supporting one another (being there for one another)
- Together we can do better than when we are alone

Module 6:

Good Nutrition

Prompting Questions

1. Why good nutrition important for growth?
2. What can we do to ensure we get good nutrition?

Key messages

- Good nutrition helps growth, development, healing the body from sickness
- Good nutrition helps makes energy in the body for movement and working

Social support and Kitchen Gardening

Prompting Questions

1. What are the kitchen gardens?
(Small gardens are set up on small pieces of land or soil in containers around the house)
2. What are the biggest challenges for families in creating kitchen gardens?
Probe the groups for answers (Lack of commitment, lack of seed, drought, lack of gardening tools ...)

Key Messages

- Through our care groups, we can be able to support one another in backyard farming.
- Grow some vegetables around the home in order to improve the value of the food prepared for children.

Module 7:

Child development

Prompting questions

1. Why is baby's development important?
2. What can babies learn from their parents?

Key messages

- Baby's development is as important as baby's health
- Parents' are the baby's first teachers

Child stimulation

Prompting questions

1. Why is talking and singing to babies important?
2. What do you do when your baby cries?

Key messages

- Talk and sing to your baby as often as you can
- Comfort your baby when he or she cries

Module 8:

Exclusive breastfeeding

Prompting questions

1. In your community, what foods are good for breastfeeding mothers to eat?
2. How does mothers eating affect her breastmilk?

Key messages

- Breastfeeding mothers need to eat more food and a variety of food.
- Healthy eating helps mothers produce enough breastmilk for their baby.

WASH

Prompting questions

1. When do we need to wash our hands and how?

(Prompt to the need to wash hands even if they don't look dirty, germs are invisible)

2. How do you keep your house and compound clean?

Key messages

- Wash your hands with clean water and soap (or ash) before preparing food, when cooking, before eating, before breastfeeding, after cleaning your child's bottom, and after defecating.
- Clean your house and your compound at least once a day.

Module 9:

Feeding sick child

Prompting Questions

1. What can we feed a child when it is sick?
2. What are some of the signs we need to look out for to know that a child is sick?

Key messages

- Sick children under 6 months should continue to breast fed more frequently
- Take the child to the health center, and get advice from the health worker

Father involvement in childcare

Prompting questions

1. Why is it important that fathers help in taking care of the baby?
2. What can a father do to help the mother raise their baby?

Key messages

- Fathers and mothers are both responsible for raising their baby.
- Fathers and mothers should agree on sharing household chores.

Module 10:

Father involvement in child stimulation

Prompting questions

1. What do fathers do when they are alone with their baby?
2. How often do fathers hold the baby?

Key messages

- Fathers need time alone (one-on-one) to talk and play with the baby.
- Fathers should hold the baby at least once a day.

Household nutrition diversity

Prompting Questions

1. What are some of the challenges faced in the community towards good household nutrition?
2. How can we overcome challenges of poor feeding in a home?

Key Messages

- Healthy food keeps a child and family members healthy, strong and smart.
- Eating more food in different colors means more nutrition helps protect a child and family members from sickness.

Module 11:

Child stimulation

Prompting questions

1. What do you do when you are alone with your baby?
2. What do you do when you see your baby move around and grab things?

Key messages

- Take time every day to play with your baby
- Encourage your baby to move around on his own

Peer support

Prompting Questions

1. How can group meetings help fathers improve support to their families?
2. How can the community support fathers in taking care and providing for their family?

Key Messages

- In social groups, people get to exchange ideas and share experiences on best health practices
- In social groups, people offer and receive support to help improve the health, well-being, of their families.

Module 12:

Child WASH

Prompting questions

1. How do you keep the areas where your child plays clean and dry?
2. Why is it important to put your child's feces in the latrine?

Key messages

- Always keep all areas where your child plays clean and dry
- Always throw away your child feces in the latrine

Continued breastfeeding

Prompting questions

1. In your community, for how long do most mothers breastfeeding their baby?
2. What are some reasons that mothers stop breastfeeding?

Key messages

- Breastfeeding should continue until the child is at least two years old.
- Breastmilk helps protect the child from becoming sick.

Module 13:

Feeding a Sick Child

Prompting questions

1. What foods should you give a sick child with dehydration?
2. Where can parents get support in case a child falls sick?

Key messages

- Take a child with a danger signs (vomiting, diarrhea, fever, lack of appetite) to the Health Centre immediately.
- Give any child (above 6 months) with dehydration or diarrhea oral rehydration salt (ORS)

Responsive Feeding

Prompting questions

1. Do you think babies are able to know when they are full or hungry?
2. How do you know when your baby likes or dislikes a food?

Key messages

- Make feeding times happy for the baby by being patient and making eye contact.
- Give new foods many times, they may not like new foods in the first few tries but keep trying.

Module 14:

Child Feeding – Introduction of solid and semi-solid foods

Prompting questions

1. What foods do we give infants when they reach 6 months?
2. Why should mothers still breastfeed their babies even if they start to eat after 6 months?

Key messages

- Start giving your child foods like porridge, mashed banana or mashed potato when he/she reach 6 months.
- Breastfeed first before giving other foods.

Complementary feeding (Father involvement)

Prompting questions

1. How can fathers help the mothers feed the baby?
2. What prevents fathers from helping more the mothers feed the baby?

Key messages

- Fathers should help mothers find good food for the baby.
- Fathers can help the mother feed the baby.

Module 15:

Complementary feeding

Prompting questions

1. What kind of foods should a baby older than 6 months eat?
2. Why is eating colorful or variety of food important for babies older than 6 months?

Key messages

- Provide a variety of colorful food for child older than six months.
- Give meat, chicken, fish, or eggs at least 3 times a week or every day if you can.

Complementary feeding (Cooking Demonstration-session)

Sample meals from local blended staples that may be used for introduction of solid semi-solid and soft foods

Module 16:

Water, Sanitation and Hygiene

Prompting questions

1. What needs to be clean before you feed your child?
2. What happens if you give your child leftover foods that was not covered?

Key messages

- Use clean water and soap (or ash) to clean your hands, your child's hands, and the utensils you use before feeding your child
- Cover your food and heat up leftovers before feeding to your child

Complementary feeding (Cooking Demonstration-session)

Sample meals from local blended staples that may be used for introduction of solid semi-solid and soft foods

Module 17:

Complementary Feeding

Prompting questions

1. How many times in a day should children 6-8 months eat complementary food?
2. What prevents parents from feeding their children 2-3 times a day?

Key messages

- Breastfed babies 6-8 months old need to be fed foods at least two times a day.
- Babies 6-8 months old who are not breastfed need to be fed foods at least four times a day.

Complementary feeding (Cooking Demonstration-session)

Sample meals from local blended staples that may be used for introduction of solid semi-solid and soft foods

Module 18:

Maternal mental health

Prompting questions

1. What do people in your community do when they feel sad or angry?
2. How are people who feel stressed supported by the community?

Key messages

- When people feel sad or angry, it's important to talk to someone or get help.
- Psychosocial resources in the community are there to help all people.

Module 19:

Maternal mental health

Prompting questions

1. How does the community view people who have mental health issues?
2. What are some of the causes of mental health issues in your community?

Key messages

- Mental health is a health condition and is not the individuals' fault.
- It is healthy and important for people to seek out help for mental health issues.

Module 20:

Refresher training: Complementary feeding

Prompting questions

3. What kind of foods should a baby older than 6 months eat?
4. Why is eating colorful or variety of food important for babies older than 6 months?

Key messages

- Provide a variety of colorful food for child older than six months.
- Give meat, chicken, fish, or eggs at least 3 times a week or every day if you can.

APPENDIX F: Research approval from Oklahoma State University



Oklahoma State University Institutional Review Board

Application Number: HS-19-2
Proposal Title: Peer groups to improve feeding practices and child nutrition in post-emergency settlements in Uganda

Principal Investigator: Joel Joshua Komakech
Co-Investigator(s): Barbara Stoecker, Christine Walters, Hasina Rakotomanana
Faculty Adviser: Deana Hildebrand
Project Coordinator:
Research Assistant(s):

Status Recommended by Reviewer(s): Approved

Study Review Level: Expedited
Modification Approval Date: 12/05/2019

APPENDIX G: Research continuation approval from Oklahoma State University



Oklahoma State University Institutional Review Board

Date: 01/06/2020
Application Number: HS-19-2
Proposal Title: Peer groups to improve feeding practices and child nutrition in post-emergency settlements in Uganda

Principal Investigator: Joel Joshua Komakech
Co-Investigator(s): Barbara Stoecker, Christine Walters, Hasina Rakotomanana
Faculty Adviser: Deana Hildebrand
Project Coordinator:
Research Assistant(s):

Processed as: Expedited Continuation

Status Recommended by Reviewer(s): Approved

Continuation Approval Date: 01/06/2020

APPENDIX H: Research approval from Makerere University Kampala



May 02th, 2019

Mr. Joel Joshua Komakech
Department of Nutritional Sciences
Oklahoma State University-USA

Category of review

- Initial review
 Continuing review
 Amendment
 Termination of study
 SAEs

Dear Mr. Komakech,

Re: Approval of research protocol #SHSREC REF: 2019-020
"Peer Groups to Improve Feeding Practices and Child Nutrition in Post Emergency Settlements in Uganda"

Thank you for submitting an application for ethical review of the above referenced research protocol. The committee reviewed it and granted approval for **one (1) year**, effective **May 02nd, 2019**. Approval is valid until **May 01st, 2020**.

Continuing Review

In order to continue working on this study (including data analysis) beyond the expiration date, the School of Health Sciences Research and Ethics Committee must reapprove the protocol after conducting a substantive, meaningful, continuing review.

This means that you must submit a continuing report form as a request for continuing review. To best avoid a lapse, you should submit the request six (6) to eight (8) weeks before the lapse date. Please use the forms supplied by our office.

Amendment Review

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek School of Health Sciences Research and Ethics Committee approval before implementing it.

Please summarize the proposed change and the rationale for it in a letter to the School of Health Sciences Research and Ethics Committee. In addition, submit two (2) copies of an updated version of your original protocol application- one showing all proposed changes in bold or 'track changes,' and the other without bold or track changes.

Reporting

Other events which must be reported promptly in writing to the School of Health Sciences Research and Ethics Committee include:

APPENDIX I: Research continuation approval from Makerere University Kampala



June 02nd 2020

Mr. Joel Joshua Komakech
Department of Nutritional Sciences
Oklahoma State University-USA

Category of review
 Initial review
 continuing review
 Amendment
 Termination of study
 SAEs

Dear Mr. Komakech

Re: Research proposal entitled: “Peer Groups to Improve Feeding Practices and Child Nutrition in Post Emergency Settlements in Uganda” SHSREC REF NO. 2019-020

On behalf of the committee, I write to inform you that the proposed extension / renewal has been approved.

Renewal Valid Approval Date: 02nd June, 2020
Renewal Expiration Date: 01st June, 2021

The Makerere University School of Health Sciences Research and Ethics Committee (SHSREC) initially first reviewed and approved the above-referenced research protocol on the 02nd of May 2019 and this approval expired on 01st of May 2020.

The review by the committee has found that your renewal is consistent with the continued protection of the rights and welfare of research participants of which the protection of research participants is a partnership between the Research and Ethics Committee (REC) and the investigators. We look forward to working with you as we both fulfill our responsibilities.

Renewals: REC approval is valid until the expiration date given above. If you are continuing your project, you must submit an Application for renewal at least six (6) to eight (8) weeks before the lapse date. If the project is completed, please submit an application for permanent closure.

Amendments: The REC must review any changes in the project, prior to initiation of the change. Please submit an Application for Amendments to have your changes reviewed and summarize the proposed change and the rationale for it in a letter to the School of Health Sciences Research and Ethics Committee. If changes are made at the time of renewal, please include an Application for Amendments with the renewal application.

APPENDIX J: Research approval from Uganda National Council for Science and Technology



Uganda National Council for Science and Technology
(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS 5038

6th August 2019

Mr. Joel Joshua Komakech
Principal Investigator
C/o Makerere University Kampala
Kampala

Dear Mr. Komakech,

Re: Research Approval: Peer Support Groups to Improve Infant and Young Child Feeding Practices (IYCF) and Child Nutrition in Post – Emergency Settlements in Uganda

I am pleased to inform you that on **30/07/2019**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **30/07/2019 to 30/07/2020**.

Your research registration number with the UNCST is **SS 5038**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

APPENDIX K: Permission to conduct research from Office of the Prime Minister,
Uganda



THE REPUBLIC OF UGANDA

OFFICE OF THE PRIME MINISTER

PLOT 9-11 APOLLO KAGGWA ROAD. P.O. BOX 341, KAMPALA, UGANDA

TELEPHONES: General Line 0417 770500, Web: www.opm.go.ug, E-mail: ps@opm.go.ug



In any correspondence on this subject, please quote No: *OPM/R/107*

July 30, 2019

Mr. Jesse Kamstra,
Country Representative,
The Lutheran World Federation Uganda.

RE: PERMISSION TO ACCESS REFUGEE SETTLEMENTS UNDER ADJUMANI AND MOYO DISTRICTS

Reference is made to your letter dated July 26, 2019 in regard to the above subject matter.

This is to authorize Joel Joshua Komakech, Christine Walters and Hasina Rakotomana from Oklahoma State University to undertake a study titled "*Peer Groups to Improve Feeding Practices and Childhood Nutrition in Post Emergency Settlements in Uganda*", from August 1-31, 2019 in Refugee Settlements under Adjumani and Moyo Districts.

They are requested to observe the rules and regulations governing the settlements. Office of the Prime Minister authorities in the settlements are hereby requested to accord them the necessary assistance.

Jesse Kamstra
JUL 30 2019
OFFICE OF THE PRIME MINISTER

Gerald Mwenya
FOR: PERMANENT SECRETARY

C.C. Refugee Desk Officer
Adjumani

C.C. Refugee Desk Officer
Arua

*Access Adjumani, Pagineya
and Arua*
once more.

[Signature]

OFFICE OF THE PRIME MINISTER
ADJUMANI REFUGEE DESK
14 JAN 2020
14/01/2020

APPENDIX L: Permission to conduct research from the Adjumani District Local Government



ADJUMANI DISTRICT LOCAL GOVERNMENT

OFFICE OF THE CHIEF ADMINISTRATIVE OFFICER

P.O. Box 2, Adjumani

District Chairperson
Chief Administrative Officer
Email:

0787930220
0781560782/0754420579
cao.adjumani@gmail.com

IN ANY CORRESPONDENCE ON THIS SUBJECT

PLEASE QUOTE NO: **CR/220/01**

Wednesday 15th January, 2020

Doctoral Student/Researcher
Department of Nutritional Sciences, College of Human Sciences
Oklahoma State University

**PERMISSION TO CARRY OUT RESEARCH BY STUDENT COLLABORATING WITH
MAKERERE UNIVERSITY KAMPALA**

Yours dated 15th January, 2020 refers.

This is to inform you that you have been granted permission to carry out research on social support groups, maternal mental health conditions and the relation to child nutrition and feeding practices in post emergency settlements in Uganda.

By a copy of this letter, the District Health Officer, Medical Superintendent and all the Senior Assistant Chief Administrative Officers are requested to accord you the necessary assistance you may need.



Bwayo Gabriel Rogers
CHIEF ADMINISTRATIVE OFFICER

- Copy to: District Chairperson, **Adjumani**
Resident District Commissioner, **Adjumani**
District Health Officer, **Adjumani**
Medical Superintendent, Adjumani Hospital
All LCIII Chairpersons, **Adjumani District**
All Senior Assistant Chief Administrative Officers, **Adjumani**

VITA

Joel Joshua Komakech

Candidate for the Degree of

Doctor of Philosophy

Dissertation: PEER SUPPORT GROUPS IMPROVE INFANT GROWTH AND COMPLEMENTARY FEEDING PRACTICES AMONG REFUGEES IN POST-EMERGENCY SETTLEMENTS IN THE WEST-NILE REGION IN UGANDA

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in July, 2022.

Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in 2018.

Completed the requirements for the Master of Public Health at Clarke International University, Kampala, Uganda in 2014.

Completed the requirements for the Bachelor of Science in Human Nutrition and Dietetics at Kyambogo University, Kampala, Uganda in 2010.

Experience:

Graduate Research/Teaching Associate (July 2017 – July 2022)
Program Manager, Action Against Hunger USA, Uganda Mission 2016 – 2017
Program Manager, The Hunger Project Uganda 2010 - 2016

Professional Memberships:

American Society for Nutrition; Society for Nutrition, Education and Behavior