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# Growth Charts Project

## Qualitative Follow-up Report



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Zambia

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Innovations for Poverty Action (IPA) is a research and policy non-profit that discovers and promotes effective solutions to global poverty problems. IPA brings together researchers and decision-makers to design, rigorously evaluate, and refine these solutions and their applications, ensuring that the evidence created is used to improve the lives of the world's poor.

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## Executive Summary

In Zambia, 40% of children under the age of five are stunted (DHS 2014). Addressing stunting in children requires continuous efforts by caregivers; if caregivers are unaware of their child's growth faltering, increased attention to child nutrition in the household seems unlikely. In 2015, we conducted a cluster-randomized trial to test a pair of interventions designed to provide caregivers with information on their children's physical growth (Fink et al. 2017). This report describes a qualitative follow-up study with participants of that trial. The aim of the follow-up study was to learn about parents' perceptions of the original interventions and to understand the general views of parents on early child physical growth. The learnings generated by this follow-up study will be used to refine the design of the interventions and will also shed light on challenges in addressing child growth in Zambia more generally.

We revisited communities and households enrolled in the original trial and conducted fourteen focus group discussions (FGDs) and 25 in-depth interviews (IDIs). Discussions focused on the following main themes:

- Knowledge about child growth
- Perceptions of own child's growth
- Use of the growth chart poster
- Experience in the community growth monitoring intervention
- Use of the poster with non-study children (poster only)
- Learning and behavior change, overall opinion of the intervention
- Design of the growth chart
- Information about child diet on the growth chart
- Aspirational pictures.

Information collected during FGDs and IDIs were analyzed thematically using concept- and data-driven coding to generate codes, subthemes and major themes. In the analysis, we used both inductive and deductive reasoning. Transcripts were read critically to identify the key concepts (codes). The key concepts were then categorized according to the broad idea that they represented. Lastly, the categories were analyzed and grouped according to the predetermined themes from the interview/discussion guides.

The study generated several key findings. First, most caregivers in the study showed considerable knowledge on health, nutrition, and child growth. Second, most participants were able to demonstrate how to use the growth charts to determine the growth rate of their children. Third, the study found that participants felt that they had substantial awareness of stunting, its causes and how it can be corrected in children under the age of five years. However, it was also apparent that some caregivers believed that short stature in children was primarily due to genetics rather than diet and therefore nothing can be done to address stunting. The study also revealed that some caregivers were not able to differentiate what they were empowered to do to address their child's stunting at home as opposed to what they should expect external actors and the local health system to do. Some caregivers thought the growth charts were only to be used by IPA staff and that it was not their responsibility to track the growth of their children. Lastly, the study also found that husbands have a very important role in decision making when it comes to purchasing more food for the household.

The finding that some caregivers believe that short stature in children was primarily due to genetics or God rather than diet and therefore nothing can be done to address stunting poses a critical challenge. This is because such beliefs could result in caregivers not adopting better feeding habits for their children. As a result of this finding, future growth charts should be designed to clearly communicate that caregivers have

the power to change the height and stature of their children. Future iterations of growth charts should also explain what is genetic versus what caregivers can do.

The finding that some caregivers thought the growth charts were only to be used by IPA staff and that it was not their responsibility to track the growth of their children suggests that some study participants did not take responsibility for the task of tracking the growth of their children but rather shifted the responsibility to IPA. Furthermore, most participants did not use the growth charts on non-study children because they thought that they were only meant for study children. To tackle the problem of caregivers not being able to differentiate what they are empowered to do as opposed to what the system can do, charts should be refined to clarify parent empowerment based on community input. This should be done in order to get buy-in from the community.

Growth charts were considered easy to use and were understood by most caregivers. The participants noted that the language, illustrations and even the design used in the growth charts were very attractive. However, some participants felt the poster had certain food items that could not easily be acquired or accessed in a rural setting. Thus, they advised that a future design of the growth charts should have food items that can be locally sourced or produced. It was also noted that some participants had problems interpreting what the color bands on the posters meant. Most participants interpreted yellow as meaning that the child's height had improved. On the other hand, participants seemed not to have problems with interpreting the meaning of the red and green colors. Potential modification could be to have only have the green and red color bands on the Growth charts since most people can understand these without challenge.

The study also found that husbands have a very important role in decision making when it comes to purchasing more food for the household. However, most men did not know how to use the growth charts. Men's limited knowledge on how to use the poster could result in limited willingness to support increased food acquisition. Since the study revealed that men are very involved in making decisions about buying more food for the households, it will be beneficial to actively involve them in the next study both during the training and measuring height.

The four main themes emerging from the study are the following:

1. **Male involvement in training and measuring height** – Men having a critical role in decision making when it comes to purchasing more food implies, they could directly influence how much food is allocated to children.
2. **Parent empowerment based on community input** – it is critical to get buy-in from the community if caregivers are to fully accept the interventions.
3. **Nature versus nurture** – it is necessary to deliberately reinforce that even with resource constraints, caregivers can still have a positive impact on child growth.
4. **Design of growth charts** - Potential modification could be to have only have the green and red color bands on the growth charts since most people can understand these without much of a challenge.

# 1. Background and Introduction

Childhood stunting<sup>1</sup> is highly prevalent in Zambia as well as other developing countries. According to recent estimates, 40% of children under five in Zambia are stunted, and 17% of children are severely stunted (Zambia Central Statistical Office et al. 2014). The 2011 National Food and Nutrition Strategic Plan for Zambia 2011-2015 identified prevention of stunting in children younger than two (part of the first 1,000 most critical days of life) as its Strategic Direction Number One (SD1), and the early identification, treatment, and follow-up of severe acute malnutrition (SAM) as SD3 (National Food and Nutrition Commission of Zambia 2011). The ultimate objective of the national strategy was to reduce stunting among children younger than two to 30% nationally. Estimates also show that more than thirty percent of children in developing countries experience severely delayed growth (de Onis et al. 2012). There are multiple causes of stunting, and poor physical development more generally (Walker et al. 2007). While poverty is a strong social determinant of physical underdevelopment, key proximate causes include poor nutritional intake and exposure to infections that inhibit the body's ability to process and absorb nutritional content. Stunting has been shown to be strongly correlated with several other important indicators of child development, including language and motor skills and socio-emotional functioning (Grantham-McGregor et al. 2007). Children stunted during early childhood generally do not do as well in school as their peers and eventually earn less income during their adult years (Victora et al. 2008).

## 1.1 Parental Awareness and Investments in Children

One key challenge in addressing stunting is that stunted children often seem healthy and may be perceived as “just a little small” by their parents. Assessing children's growth and development is particularly difficult in settings where developmental delays are common, as is the case in many rural areas of Zambia. Even children who suffer from substantial growth faltering may be perceived as of normal size in comparison to peer children in their community. Several studies have documented a negative relationship between parental education and investments in child health and nutrition even after controlling for socioeconomic status (Desai and Alva 1998; Frost et al. 2005). While part of this relationship appears to be explained by cultural practices, there is increasing evidence that poor awareness on the part of some parents of their children's health and nutritional needs may also be important. Recent studies in Bangladesh and Nigeria have found that parents often fail to correctly recognize the symptoms of infectious diseases in their children (Choi et al. 2010; Rockers and McConnell 2017). Furthermore, according to data from four developing countries collected as part of the recent Young Lives study, as much as two-thirds of parents of stunted children identify their child as being “of normal height” (Barnett et al. 2013).

## 1.2 Interventions to Increase Parental Investments in Child Health and Nutrition

There is growing interest in designing and evaluating programs and interventions that aim to increase parental commitment to child health and nutrition (Engle et al. 2007). Some of these programs aim to stimulate parental involvement by providing cash subsidies or incentives (e.g., conditional cash transfer programs) (Hoddinott and Skoufias 2004). Other programs aim to educate parents on best practices for raising their children, including practices related to feeding and nutrition (Aboud 2007). One important

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<sup>1</sup> Stunting is an indicator of chronic malnutrition and impaired development defined as a height-for-age of more than two standard deviations below the standard population median.

limitation of the interventions that have been tested is that they require parents to interact with clinicians or other professionals to obtain timely information on the developmental status of their children.

In 2015, we conducted a cluster-randomized trial to test a pair of interventions designed to provide caregivers with information on their children's physical growth (Fink et al. 2017). The interventions were: 1) quarterly community-based growth monitoring meetings; and 2) home-based growth charts.

Home-based growth charts were found to reduce stunting by 22 percent among children who were stunted at baseline. This report describes a qualitative follow-up study with participants of the trial described in Fink et al. (2017). The aim of the follow-up study was to learn about parents' perceptions of the original interventions and to understand the general views of parents on early child physical growth. The learnings generated by this follow-up study will be used to refine the design of the interventions and will also shed light on challenges in addressing child growth in Zambia more generally.

## 2. Methodology

### 2.1 Study Design

We conducted 25 qualitative in-depth interviews (IDIs) and fourteen focus group discussions (FGDs) with a subsample of participants from the trial described in Fink et al. (2017).

### 2.2 Sampling

Participants were selected using a convenience sampling method. IDIs were conducted at the household of the respondent while FGDs were held in the village of the participants and included on average six participants in each discussion. To find the participants, household IDs that were used in the previous study to indicate the villages and households were used.

### 2.3 Interventions in the Original Study

No interventions were implemented in this qualitative follow-up study. The interventions that were evaluated in the original study are the following:

#### **INTERVENTION 1: HOME-BASED GROWTH CHARTS**

To enable parents to monitor their children's health and development in the original study, we provided households with a simple growth chart wall poster.

#### **INTERVENTION 2: COMMUNITY-BASED MONITORING**

To more directly provide caregivers with information about their children's height and weight in the original study, parents were invited every three months to bring their children to a community meeting where children were measured by a trained health worker, and parents were informed if their children were below the reference measures established by the World Health Organization.

### 2.4 Data Collection

**In-depth interviews:** We conducted qualitative interviews with participants from both the home-based (growth chart) intervention and the community-based intervention. The interviews covered the following lines of inquiry or themes.

THEME 1: KNOWLEDGE ABOUT CHILD GROWTH

THEME 2: PERCEPTIONS OF OWN CHILD'S GROWTH

THEME 3A: USE OF THE GROWTH CHART POSTER

THEME 3B: EXPERIENCE IN THE COMMUNITY GROWTH MONITORING INTERVENTION

THEME 4: USE OF THE POSTER WITH NON-STUDY CHILDREN (POSTER ONLY)

THEME 5: LEARNING AND BEHAVIOR CHANGE

THEME 6: OVERALL OPINION OF THE INTERVENTION



Figure 2-1: Interviewer Conducting In-depth Interview

**Focus group discussions:** We conducted focus group discussions with participants from the home-based (growth chart) intervention only. The discussions focused exclusively on the design of the growth charts and covered the following lines of inquiry or themes.

THEME 7: DESIGN OF THE GROWTH CHART

THEME 8: INFORMATION ABOUT CHILD DIET ON THE GROWTH CHART

THEME 9: ASPIRATIONAL PICTURES



Figure 2-2: All Women Focus Group Discussion

## 2.5 Data Analysis Approach

The data was analyzed thematically using concept- and data-driven coding to generate codes, subthemes and major themes. In the analysis, we used both inductive and deductive reasoning and NVIVO 12 was employed to help with data management and storage. The analysis process followed a systematic and well thought out process involving four essential steps;

1. Raw data management – ‘data cleaning’
2. Data reduction, I, II –‘chunking’, ‘coding’
3. Data interpretation –‘coding’, ‘clustering’
4. Data representation –‘telling the story’, ‘making sense of the data for others’

Firstly, all the transcripts were read for familiarization. After this, the transcripts were read more critically to identify the key concepts (codes). At this point, we created an initial code list or master code book. The key concepts were then categorized according to the broad idea that they represented. Lastly, the categories were analyzed and grouped according to the predetermined themes from the interview/discussion guides. Data was analyzed in two parts; one part that contained views and experiences on using the growth charts while the other reflected the reactions from the community meetings. Two people were employed to analyze the data separately. At the end, both were able to compare notes and develop a final document. Doing this allowed the two to have a richer and more objective analysis of the data.

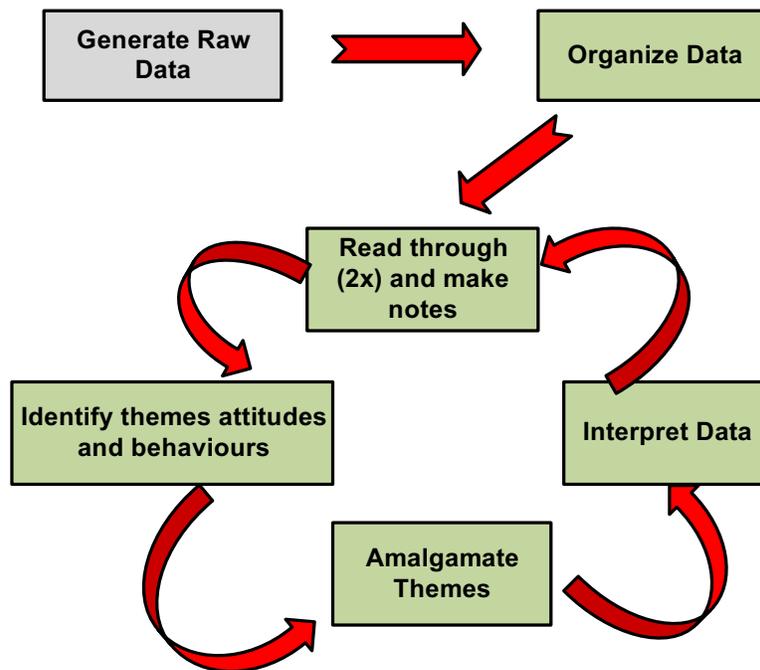


Figure 2-3 Graphical Representation of Data Analysis Modified after Creswell (2009)

### 3. Findings

#### 3.1 Views and Experiences on Using Growth charts

The table below shows recurring ideas and themes from the analysis of IDIs and FGDs conducted with participants who had received growth charts. A total of twelve IDIs and fourteen FGDs (two all-men and twelve all-female) were conducted. The average number of respondents per focus group was six. The total number of participants was 81.

Table 3-1: Results from thematic analysis of FGDs and poster IDIs

CODES	SUB-THEMES	MAJOR THEMES
<ul style="list-style-type: none"> <li>▪ Explanation of poster colors</li> <li>▪ Importance of age in using growth charts</li> <li>▪ Importance of gender in using poster</li> </ul>	Interpretation of poster content	Application of poster knowledge
<ul style="list-style-type: none"> <li>▪ Use of poster in household</li> <li>▪ Content and importance of poster</li> <li>▪ Overall improvement of poster</li> </ul>	Use of poster	
<ul style="list-style-type: none"> <li>▪ Genetics</li> <li>▪ God/nature</li> <li>▪ Feeding habits</li> </ul>	Child growth	Knowledge on nutrition and child growth
<ul style="list-style-type: none"> <li>▪ Feeding times</li> <li>▪ Types of food for child's growth</li> </ul>	Child diet/nutrition	

<ul style="list-style-type: none"> <li>▪ Importance of roller meal to child's growth</li> <li>▪ Perceived impact of good diet on children</li> </ul>		
<ul style="list-style-type: none"> <li>▪ Child growth priorities</li> <li>▪ Perceived impact of pictures</li> </ul>	Growth aspirations	Learning and behaviour change
<ul style="list-style-type: none"> <li>▪ Barriers to behavior change</li> <li>▪ Measures to counter barriers</li> </ul>	Barriers to behaviour change	

### 3.1.1 APPLICATION OF POSTER KNOWLEDGE

This section presents the views and perceptions that the participants had over the use of the poster and the perceived benefits of the poster. Overall, most of the participants showed a good understanding of what the poster was about and its content. They were also able to demonstrate how the poster was used. Below we present specific views and perceptions relating to the growth charts that were distributed in the study areas.



Figure 3-1: Growth chart from original study hanging in a house

#### 3.1.1.1 INTERPRETATION OF POSTER CONTENT

**Explanation of Poster Colors:** Participants showed varying understanding on what the colours denoted. Approximately 39.51% (32/81 of both men and women who participated in FGDs) of participants could not recall what the colors meant, while approximately 60.5% showed considerable understanding of what the colors meant. Results show that majority of the women understood how to use the poster and correctly interpret the colors on the poster. A majority of the women were able to prescribe the next course of action should a child fall in any of the colors branded on the poster, with others noting that a child in red needed immediate medical attention from the health facility. On the other hand, other participants indicated that

children that fall in the yellow and green category needed extra care and feeding to stop them from going into the danger zone (Red Area).

*"We first put up the poster to the wall. After that, the child stands close to the poster then we measure to see the height. So, if the height is in yellow then the child is fine but if the height is in red then the child is not fine, so we mark on the poster ... Red is not good. They said that if a child is in red, then the child is not healthy, yellow means the child is improving, and green means the child is healthy."* **FGD Females - Village\_ID142&146**

*"We learned that we should measure the child and that there are 3 lines; red, green and yellow. So, if the child's height is in red that means the child is not growing well, if it's in yellow that means the child is in between and in green that means the child is growing well. But if you see that the child is not growing well you can go to the nearest clinic or use the phone number on the poster."* **FGD-Females - Village\_ID78**

Despite having knowledge on what measures to take when a child falls below the red zone, some of the participants noted that they felt demotivated to take their children to the clinic as they thought the clinic couldn't help them. Though this was not very common among the study participants, some participants accused health practitioners at clinics of being negligent and offered little help to mothers who took their children to the clinics.

*"We have a problem with our clinic here. Even when they notice that a child is not in good health they offer no help. They can't even give the child HEPS (soya bean meal) to boost the child's health. I was cooking porridge. She was always in red as you can see her with her small body. (Points to the child playing)"* **FGD Females - Village\_ID23**

Despite the majority of the women who had a good understanding of how to use the poster, some of their male counterparts had challenges in explaining how to use the poster.

Others felt the poster was only to be used by IPA study staff while others could not remember how to use the poster and what some of the colours on the poster meant.

*"I thought that when you (IPA) came and measured the children that time, then that was the end of it. We thought we did not have to continue to measure the child's height."* **FGD-Males\_Village-ID3**

F: What of the colors on the poster? When you look at the poster it has different colors green, yellow and red. What do these colors represent? P5 can you help us? Do you know what they represent?

R5: I was taught but I have forgotten.

R4: If the child is not growing up healthy or properly he will be in red or yellow.

F: What if the child is green, what does that mean?

P4: If the child is in green then he is not progressing.

**FGD-Males\_Village\_ID3**

Some of the male participants were however able to correctly explain how to use the poster and explain what the colors on the poster meant. They were also able to state the course of action should a child fall within the red or danger area even though they were some extreme messages that come out; for example, that a child whose height is in the red would die.

*“There are 3 colors there, from down we find color red then yellow and green. If you measure a child and the head is in red, that means the life of that child is in danger such that maybe he/she can even die then if the child is in yellow, we should continue feeding the child with food like groundnuts, Kapenta and so on so that the child can move from yellow because if you don’t, the child may go back in red so the child should move from yellow to green.” FGD Male - Village\_ID189*

**Importance of Age in Using Growth Charts:** Both male and female participants were able explain the importance of knowing the child’s age when using the growth charts. The participants noted that age was important as it helped them know whether the child was stunted. However, about 35% (24/69 females who participated in FGDs) of the female participants could not fully explain why age was important in determining the health of their children.

*“It’s important to know the age of the child. By considering the age, one can tell if a child is growing or not. Sometimes we can say that a child not growing when it is growing. It all depend with the families; maybe the parents are short. This way we can just look at the child and conclude that they are healthy even when she is short.” FGD-Females\_Village-ID78*

*“It’s important because on the chart there is order of the children how they grow so as a parent you need to know that my child is now 1 year and some months, 2 years and some months up to 5 years so its important parents to know the age of the child so that you can know how the child is growing.” FGD-Females\_Village-ID168*

**Importance of Gender in Using Poster:** This part of the study had mixed views, with about 29.6% (24/81) of participants claiming that they did not know that the growth charts had different targets for male and female children while about 72.8% showed knowledge of the differences in the growth charts concerning the sex of their children. Some participants noted that the growth charts were made for different sexes because they perceived female children to grow at a faster rate as compared to their male counterparts and as such, the two would not use the same poster to measure their growth.

*“Yes, you need to know because girls and boys grow up differently, girls they grow up faster than boys.” FGD Females - Village\_ID142&146*

*“There is a difference, the way boys grow, and the way girls grow, girls grow faster than boys so if you measure a girl on the poster for boys you find that the outcome will be different because boys grow slow compared to girls.” FGD Male - Village\_ID189*

### 3.1.2 USE OF THE POSTER

**Use of Poster in Household:** About 12.5% (12/81) of the participants could hardly recall how to use the poster in their households. The majority (85.2%) on the other hand used the growth charts to monitor the growth of their children. An attempt was made to understand if the participants used the poster to monitor

the growth of other children not on the program who were either part or not part their households. Interestingly, results indicate that the participants only used the growth charts to monitor the growth of their children who were on the program when the growth charts were introduced. They believed that growth charts were only meant to monitor the growth of the children that were on the program and no one else. They did not use the poster to monitor the growth of other children within or outside their households not on the program.

I: *Have you used the poster with other children in your household?*

R: *No.*

I: *Why not?*

R: *Nothing. The poster was for one child so why would we use it on other children?*

I: *Where you told not to use it on other children?*

R: *No, they (IPA staff) didn't stop us.*

I: *What of other children not in your family, did you ever use the poster to measure them?*

R: *No... It was not meant for them. **IDI-Poster\_Village-ID\_200\_200031***

I: *Did you use the poster on other children who are not from your household?*

R: *No, I didn't... Because I saw that this poster was given to me for my child at home.*

**IDI-Poster – Village\_ID200\_200005**

**Content and Importance of Poster:** Both male and female participants were able to identify the content on the growth charts. They noted that the growth charts contained information that helped them track the growth of their children. Among the information they noted was the different types of food to give their children. Further, they were able to highlight some of the perceived benefits of using the growth charts, among them was that the growth charts enabled them to track the growth of their children. They also shared similar views that the growth charts imparted some knowledge in them on how many times to feed their children and knowledge on the importance of giving their children nutritious foods.

*"I usually think that this poster is a good thing as it helps me to know on whether my child is growing or not. Because before I was given this poster, I didn't know on how to monitor the growth of a child." **IDI Poster - Village ID\_83\_83018***

*"Yes. We were given the growth charts so that we can learn how to feed our children. They have pictures of foods that we should feed our children such as groundnuts, cabbage, eggs, beans and fish." **FGD Females - Village\_ID30***

*“What I learnt was that a child is supposed to be fed more than 3 times. Early in the morning you need to feed them with porridge. Around 10am you give them something to eat. At 12 or 13hrs you give them Nshima and again at about 16hrs give them some more food. This will help them to healthy unlike them being fed three times in a day on Nshima alone.”* **FGD Females - Village\_ID179**

**Overall Improvement of Poster:** Most of the participants were of the view that the growth charts used were easy to understand and follow. Participants noted that the information was easy to understand and the poster itself was not complicated to use when monitoring the growth of their children. Some of the participants noted that the local language used on the poster gave them an upper hand because majority of the people despite not being educated were able to read the local language used in those areas.

*“Thank you very much. When I see the poster, the information is written in our local language so those who have been to school there is no problem because we understand the language that is there but if it was written in Tonga or Luvale maybe it could have been difficult for us to read. So, the way I see it, there should be no change because in this area we use Nyanja, we can read English but it’s not always.”* **FGD Male - Village\_ID189**

Despite the majority sharing similar sentiments that the growth charts needed no change either in design or content, about 30% (24/81) participants felt the content of the poster needed to be changed to suit the environment they were placed in. These participants felt that some of the foods depicted on the growth charts were expensive to purchase, hence making it difficult for them to fully follow the feeding instructions on the growth charts. They thus noted that new versions of the growth charts should include food stuffs that could easily be acquired by all community members in their areas.

*R4: I think you should help us with the food that we don’t manage to find in the village but are also showed on the poster.*

*M: What kind of food?*

*R4: Those food that need money to buy and we can’t afford.* **FGD Females - Village\_ID142&146**

Other than asking for certain foods that are locally produced be added to the growth charts, some participants thought they needed more than that on the growth charts. They felt the need to have parts of the growth charts that give step by step processes on how to prepare certain foods to feed their children.

*“You can add maybe how to cook porridge mixed with soya beans and groundnuts. Or if not, how to prepare porridge mixed with a raw egg.”* **FGD Females - Village\_ID21\_ID142&146**

Others felt that knowing the height of their children during the monitoring process was not enough. Thus, they thought having an extra component to the poster would help them know the weight of their children. They asked for a scale to measure weight to be given together with the poster.

*“There can be something to add, because on the poster we just see how the child is growing in terms of the height, but we don’t know the Kgs (Kilograms). so, can we can ask that maybe you can give us a scale so that we should also know their weight... because there (Poster) we just see how their height is growing but we don’t know their weight.”* **FGD-Females\_Village\_ID168**

### 3.1.3 KNOWLEDGE ON NUTRITION AND CHILD GROWTH

Participants seemed quite knowledgeable on nutrition and child growth. However, there were diverging views on what make children tall or short and what could be done to correct the growth of children. The participants provided general answers on nutrition and were able to identify that balanced diets were vital for the growth of children. However, participants were generally unable to specifically identify which types of foods provided vitamins, carbohydrates, or proteins.

Below we present some of the specific views and experiences with regards nutrition and child growth.

#### 3.1.3.1 CHILD GROWTH

**Genetics:** When the participants were asked to explain why some children are tall while others were short, various explanations were collected and among the prominent ones was that children are either tall or short due to their genetic makeup. About 14.8% (12/81) of the participants noted that children were either tall or short depending on their father or mother and the average height in the family. While approximately 26% of the participants disputed that the height of a child cannot be corrected, a larger number argued that with a proper diet, the height of a child could be corrected.

*“Some children grow tall because of good nutrition, while others grow tall because of the genes of their parents. If the parents are tall, they can be tall. If they are short, they are also going to be short ... But again, some children can be very healthy but not growing tall... It important for a child to grow tall because this makes a parent happy seeing the child growing tall, because you know that your child is growing healthy. If your child is short, as I said earlier, good nutrition can help a child to grow tall.”* **IDI Poster - Village ID\_83\_83018**

*“Yes, but genes play a major role in determining whether the child will grow tall or short. Because if the father is tall the child may be as tall as the father and if the mother is short the child can be as short as the mother... No, there is nothing we can do to help (If the child is stunted).”* **IDI Poster - Village ID\_30\_30023**

**God/Nature:** Results indicate that some study participants believed that God and/or nature was responsible for the height of their children. They believed that God or nature decided the height of their children. Despite believing this, the participants still acknowledged the importance of having a balanced diet for their children. Participants also noted that to correct the height of children, they needed to feed Children nutritious and balanced foods.

*R: Is it not God who created? Me I can't know. They are either tall or short maybe [because it] is it the way they were created by God. But also, the way they feed can make one to be tall and the other short. But when god creates, He has created.*

*I: Is there anything that can be done to help a child to grow tall?*

*R: Its food!!*

*I: ... which food?*

*R: You need to eat different types; Nshima with fish, beans, rape, eggs. Some for buying; milk, ....* **IDI Poster - Village ID\_30\_30023**

**Feeding Habits:** It was interesting to note that the majority (74%) of the participants were able to link poor feeding habits to lack of proper child growth. The participants noted that good feeding habits would make their children grow healthy, while also stating that the opposite meant that the child's growth would be affected.

*"Some children are short because of not feeding well, not eating enough food. It is important for a child to be tall. This is because when a child is tall, they look good and a tall child is intelligent too. A tall child is healthy and eats well... A short child, it means the child is not feeding well. We need to give the child roller meal. And, the child need to eat variety foods. And vegetables [In order to grow healthy]."* **IDI Poster - Village ID\_200\_200040**

### 3.1.3.2 CHILD DIET/NUTRITION

**Feeding and Types of Foods:** It was revealed from the study that participants in different study areas acknowledged the importance of regularly feeding their children to keep them healthy. The participants believed that children needed to be fed at least three to four times a day. They demonstrated some understanding that feeding was not just about giving their children any kinds of food, but food that could keep their children healthy. They explained that children needed to be given different foods every day.

*"We should feed the children different foods. If we cook that kind of food like we discussed the groups of foods, then the child can grow well. Even for an adult, the body feels good because of that kind of food. So, we must have assorted foods just like indicated on the poster. So, one can have fish and then groundnuts or eggs. If a child can eat such foods, they would do just fine."* **FGD Females - Village\_ID30**

*"It's important that when a child is 5 or 6 months, we start feeding him porridge, we need to prepare soya beans mixed with ground nuts. In the morning you cook porridge, at lunch time they should eat Nshima with cabbage and tomatoes, afternoon, they eat porridge or rice mixed with beans. If we do that our children can grow healthy and even diseases cannot attack them."* **FGD Females - Village\_ID3**

**Importance of Roller Meal to Child's growth:** One of the key messages on the growth charts was the use of Roller Maize meal to feed children as a way of promoting health. However, it was discovered that about 61.7% of the participants used to feed their children Roller meal while others didn't. Those that did noted that Roller meal was healthy for them and their children while those that didn't acknowledged the importance of Roller meal but also noted that they couldn't continue using Roller meal because they did not like the taste. This may require a large social marketing campaign for roller meal to change norms.

*"We have run out of roller meal that's why we are using breakfast. In fact, we stopped having our maize grinded into roller meal. We just want breakfast because roller meal doesn't taste nice."* **FGD Females - Village\_ID179**

*"Yes. We were taught that a child is supposed to be fed porridge made from roller meal at least 3 times in a day that is in the morning, at noon and in the evening. There are also beans and soya beans. Soya beans should be added to the maize grain and mixed together as roller meal. There is also fish of different types which we were taught to be feeding our children."* **FGD Females - Village\_ID23**

**Perceived Impact of Good Diet on Children:** Participants were able to link improved feeding to improved child health. They noted that the knowledge gained from using growth charts and the information on the growth charts helped them track the growth of their children and were able to make necessary adjustments to their diets or feeding for improved child health. Some of the participants noted that they were able to increase the amount of food and others noted a change in the types of food they gave to their children depending on how healthy their children were after using the growth charts.

*"I increased the amount [of food] because the child is growing. We started to buy more food. I changed. I do cook different types of food, and I make sure that I cook food that have different types of vitamin. I said early on, I would feed my child with porridge mixed with groundnuts, porridge mixed with soya meal. I noticed some change afterwards. He looks much stronger, and he is growing taller and healthy."* **IDI Poster - Village ID\_83\_83018**

### 3.1.4 LEARNING AND BEHAVIOUR CHANGE

**Growth Aspirations:** For about 20% of all participants, pictures on the growth charts gave them hope that their children would one day look like those portrayed on the growth charts. They explained that they changed their perceptions on feeding because they hoped that one day, their children would look energetic like those on the growth charts. They aspired to have healthy and happy children like those depicted on the growth charts, and this seemed to be their motivation for using the growth charts.

*"Yes, these pictures are encouraging because if you look at the children on the poster, all of them they look happy. So, it encourages us to feed our children so that they can be like those. That's why we need to get those groups of food that are there to feed the child, in the morning, lunch and evening."* **FGD Females - Village\_ID30**

*"They give us encouragement that if we follow the recommended diet, our child will grow up healthy unlike the way the child dressed in red looks like on the poster. You can easily tell that that child is not healthy. (Refers to the 2 years old child on the poster) It gives us an encouragement that if we follow the information on the Growth charts our children will be growing up healthy."* **FGD Males - Village\_ID3**

However, participants expressed that sometimes they felt terrible looking at those pictures because they cannot afford to get all the foods listed for their children to grow healthy. However, the pictures of the graduates make them feel hopeful that one day their children will also go to school and make informed life choices;

*"...the poster makes me imagine that my child will grow well and go to school. These pictures are nice but to take care of child so that they can be like those is difficult and sometimes I feel bad when I look at the poster..."* **(FGD Females, Village\_ID21)**

### 3.1.5 CHILD GROWTH PRIORITIES

When the participants were asked to identify what they considered most important for their children from a list of options such as success in school, a good job, good health, good family or happiness, mixed reactions were observed. Some residents thought good health and education were more important for a child as they saw the two to be the foundation of their children's future. The participants narrated that once a child was healthy and performed well at school, then it would be easier for that child to complete school and later be able to take care of their parents.

Meanwhile, some of the participants thought school was most important for their children explaining that once a child was educated, they would be able to have a good job in the future. Having a good job for their children meant that their children would be able to lead a successful and happy life.

R4: *The first thing is that the child should have good health and then be a success in school so that in future the child will be taking care of us the parents.*

R5: *That a child should succeed in school so that in future the child can start caring for us the parents.*

#### **FGD Females - Village\_119**

*"It's important for a child to go to school, to be educated so that they can also find a job. We need to educate them, we should see that a child is now grown and that he can go to school. We should guide our children so that they can be blessed in future."* **FGD Females - Village\_ID30\_R6**

#### **3.1.6 BARRIERS TO BEHAVIOR CHANGE**

Barriers to Behavior Change: Lack of financial resources was considered a major barrier to adopting new healthy behaviors. This was common across all the study sites. Most of the participants noted that they could not afford to buy all food items recommended on the growth charts to feed their children as some of the food items were too expensive to acquire in rural areas. For some participants, droughts also posed some challenges as they could not be able to cultivate some of the food depicted on the growth charts. The participants charged that it would have been easier if the growth charts had all the food items that could easily be bought or cultivated in the areas.

*"Child's diet here in the village is difficult because we are poor, but if it's in town, you can feed the child porridge, after few minutes you give him bananas, after some minutes orange, maybe at lunch you give him nshima, in the evening if you want you can either give him porridge or nshima. Sometimes we can't manage to find all the food on the Growth charts."* **FGD Females - Village\_ID168**

*"We need to follow instructions about feeding them food which is indicated there on the poster. However, it's difficult to find the food when you're in the village so that you feed a child accordingly. Sometimes, we feed children food which would not help their bodies. We don't know the effects since they are grown now. But maybe if they can continue giving us peanut butter we can improve on how we feed our children."* **FGD Females - Village\_ID21**

**Measures to Counter Barriers:** To deal with the financial challenges that the majority of participants faced, participants undertook extra ventures to generate more income so that they could feed their families. Men and women alike sought extra income from what they locally termed as "Ganyu" which is directly translated as 'piece work.' Some of the participants sought to acquire soft loans from lending institutions while others took to farming for commercial purposes. It was also revealed that some of the participants took up fishing as an extra income generating activity to help deal with the financial challenges their families were facing.

*"During the hungry season, we surely try to look for ganyu work... Yes, the other method I use is through gardening, we sell produce from our gardening and buy some food stuff that we may not have for the child..."*

*These are the only methods I use, because in our village there is no one who can help you with credit, we depend on farming.” IDI Poster - Village ID\_83\_83018*

*“The problems are many such as the ones caused by poor rainfall last season. Our maize and groundnuts harvest were very poor. So, for us to have the means to provide for our child it is very difficult to do so... When we have grown a lot of groundnuts, we sell most of it so that we can buy more maize. For example, we harvested 11 bags of groundnuts which we sold and bought maize. Sometimes we work on other people’s fields, doing Ganyu.” IDI Poster - Village ID\_200\_200031*

### 3.2 REACTIONS FROM THE COMMUNITY MEETINGS

The table below shows recurring ideas and themes from the analysis of IDIs with participants who participated in community growth monitoring meetings. A total of thirteen were conducted.

Table 3-1: Results from thematic analysis of community meeting IDIs

CODES	SUB-THEMES	MAJOR THEMES
<ul style="list-style-type: none"> <li>▪ Importance of program</li> <li>▪ General individual and community participation</li> </ul>	Participation	Community growth monitoring program
<ul style="list-style-type: none"> <li>▪ General knowledge acquired from program</li> </ul>	Knowledge acquired	
<ul style="list-style-type: none"> <li>▪ Genetics</li> <li>▪ God/Nature</li> <li>▪ Feeding habits</li> </ul>	Child growth	Knowledge on nutrition and child growth
<ul style="list-style-type: none"> <li>▪ Types of food and their perceived impact on child’s growth</li> <li>▪ Dietary changes after attending program</li> <li>▪ Male involvement in household nutrition</li> </ul>	Child diet/nutrition	
<ul style="list-style-type: none"> <li>▪ Barriers to behavior change</li> </ul>	Learning and behavior Change	Behavior change

#### 3.2.1 COMMUNITY GROWTH MONITORING PROGRAM

##### 3.2.1.1 PARTICIPATION

**General Individual and Community Participation:** A majority of the participants were able to recall having participated in the community growth monitoring program at least more than once. Some, however, only participated in the program once, noting that they did not attend subsequent meetings because they were either away, had other commitments, or did not attend because they were not informed about the meeting beforehand. Based on the data from the RCT, we know that parents of children who were found to be non-stunted at the first meeting were unlikely to attend subsequent meetings. Other than participating in the meetings, the participants were able to recall and narrate some of the activities that took place during the meetings and what they had learnt.

*“They came with something that is long and children were laid down to measure their height, some of the things I have forgotten because it has been long, they were also checking the under five cards so if the child was under weight, they were giving HEPS [Soya Beans] for porridge.”* **IDI Community - Village ID\_199\_199045**

M: Do you remember of any program that happened when a team of people visited your village and measured the height and the weight of your children?

P: Yes! The people come.

M: ok can your try to describe how it worked?

P: They come, and they were measuring our children and they taught us how we should feed our children so that our children should grow health.

**IDI Community - Village ID\_199\_199012**

**Importance of Program:** Apart from just attending the community meetings, participants were able to explain the purpose of the program from their point of view. There were isolated cases of some participants saying they did not know the purpose of the program:

*“The purpose of that program, on that part I can’t know... The people [IPA Study Team] who came to measure children last time did not tell us anything. They just took measurements and asked us some questions, then at the end they gave us something.”* **IDI Community - Village ID\_43\_43022**

The majority of the participants were, however, able to explain the aim of the program, recalled assessments conducted on their children during the meetings, and could also recall the dietary changes they made after being advised by the IPA Study Team on the results of their children’s growth.

*“Yes, most parents attended the community meetings... I think the purpose [of the program] was to monitor the growth of the children and how parents are feeding them... For example, they said that my child was underweight, and I should be giving him porridge with groundnuts, biscuits, milk, and porridge with cooking oil. Because I did not know, I was able to agree with their assessment about my child and I started following what they said.”* **IDI Community - Village ID\_199\_199040**

### 3.2.2 KNOWLEDGE ACQUIRED

**General knowledge acquired from program:** Many of the participants narrated that they learned many things from the community meetings which they perceived to have changed their behavior. They claimed that through community meetings, they improved their knowledge on nutrition and how often they needed to feed their children to keep them healthy. They also noted that the growth monitoring program improved their knowledge on the different type of foods required to help children grow.

*“They told me that my child was growing very well, and they advised me to continue feeding my child in the same manner... I agreed [with their assessment that the child was healthy] because the measured very well and I looked up to them as though the where medical doctors... I learnt that children must be feed three times a day. They should be feed in the morning, during the afternoon and in the evening... I learnt also that*

*we need to feed our children with fish, eggs just like I said early on that even pawpaw are supposed to be given to our children.”* **IDI Community - Village ID\_199\_199012**

### 3.2.2.1 KNOWLEDGE ON NUTRITION AND CHILD GROWTH

#### 3.2.2.1.1 CHILD GROWTH

Just like the growth charts group, participants in the community growth monitoring program shared similar views on what makes a child tall or short, nourished or malnourished. Issues to do with nature or God, genetics and feeding habits being responsible for the height of their children were very common. Despite these different views in opinions, participants seemed to understand the impact of nutrition on the growth of their children. Below we present the specific issues that came out regarding children's growth.

**Genetics:** According to some of the participants, genetic makeup determined height. When asked why some children were tall and others short, some of the participants noted that the parents of a child had a role to play in their children's height, noting that if the parents were tall then their children were more likely to be tall. The opposite was also perceived to be true.

*“According to what I know, children are growing tall or short based on their family lineage... I know that children resemble their parents [in terms of height], the child follows the growth of its parents. If the parents are short the child will be short and if the parents are tall the child will be tall.”* **IDI Community - Village ID\_199\_199005**

**God/Nature:** Some participants, like in the growth charts group, believed that children are either tall or short because that is 'how God wanted them to be.' They explained that they had no control over the growth of their children but would only help the child grow in a certain way by giving that child nutritious foods recommended by medical experts.

*“If a child is tall or short, that's how God created them. God would create a child to be tall while the other to be short. We can only help the child to grow health and not to grow tall, because his growing tall is determined by God. God would create some to be tall while others to be short. Yes, through improving the diet of a child and by taking the child to the clinic so that the medical people can continue to give advice on how to care of the child. That is how we can help the child grow.”* **IDI Community - Village ID\_199\_199031**

*“Maybe that's how God created them [being tall or short], but if you were talking about being fat or thin, I could have said they don't eat well or they eat well, but since you are talking about height, that's how God created them others are tall while others are short.”* **IDI Community - Village ID\_199\_199040**

**Feeding Habits:** Poor feeding habits and lack of adequate nutritious foods were identified as some of the factors that limit a child's growth. Some participants believed that their children were either tall or short because of the food they fed them and how often they fed them. Participants argued that feeding children with foods that did not have all the required nutrients caused stunting. They thus believed that a child would grow strong and healthy if they were exposed to a variety of nutritious foods.

*“That's just their heights. Some are short while some are tall. And again, some children don't grow while others grow. Others don't feed well so the bodies are not healthy... Some it's because of food. Lack of sufficient food... For a child to grow well, he needs to feed well. A person must feed well so that the body grows well... Some foods help a child grow tall, they do. For example, giving your child groundnuts, peanut*

butter, beans, meat, and rape; at least changing the types of relish when feeding them. This way, you will see the child's body growing. Not every day okra. The child can't grow this way." **IDI Community - Village ID\_87\_87025**

### 3.2.2.2 CHILD DIET/NUTRITION

**Types of Food and Its Perceived Impact on Child's Growth:** Participants showed some understanding of the importance of giving their children a variety of nutritious foods as a way of making them have a healthy life. They noted that children would only grow healthy if they were not subjected to one type of food throughout their lives as this would lead to malnutrition and subsequently stunting.

*There healthy foods and some foods which are not healthy. For instance, if you just feed the child on one type of food like Nshima in the morning, afternoon and evening you will not see any change but by giving the child different foods such as pawpaw (Papaya), Nshima with either cabbage, beans and other relish that is when you will notice the growth of the child. **IDI Community - Village ID\_87\_87007***

*"I feed my child porridge made from pure roller meal, porridge mixed with ground nuts, cabbages, bananas, pawpaw (papaya). These foods were simple for me to provide for my child as we easily grow them, unlike some of the food stuff they mentioned such kapenta which I may not afford to buy. After some time, I noticed some changes as the child started to grow healthy... He grew both tall and increased in weight." **IDI Community - Village ID\_199\_199012***

**Dietary Changes after Attending Program:** After attending community growth monitoring meetings, some participants felt that they had to make changes to some of the foods they were feeding to their children. Participants acknowledged that after learning about the different types of food needed for child growth, some participants had to make some changes to their diets in their homes. Those who had children assessed to have been malnourished or stunted by the IPA team during the first community meetings claimed that they had to improve their diets.

*I: what did you learn from participating in the program that dealt with the growth of the child that happened in your village?*

*R: I learnt a lot of things, I learnt how to care for my child and types of food that I can feed my child for him to grow. I learnt that if the child is not feed well he becomes stunted and very weak, this changed my way of thinking regarding what to feed my child. I started doing what we were taught. And I started to give my child some foods that he needs to be eating for him to grow tall. I increased the amount of food I was giving him ... and again I concentrated on those food stuff which I never used to give my child. I changed. And introduced some foods which I never used to feed him with such as; beans, oranges and many more. [After some time] I noticed some changes, as the child started to grow tall and his weight started to increase.*

*I: What types of food did you give your child and how many times in a day were you feeding your child?*

*R: Porridge mixed with groundnuts and nshima with different relish such as beans, vegetables, kapenta etc. There was a big change, as he started to grow tall and, he increased in weight as I said early on. He became very active and full of energy. **IDI Community - Village ID\_199\_199031***

**Male Involvement in Household Nutrition:** Interviewers asked if males were involved in household dietary decision making. Results indicate that males were involved in deciding whether to make changes to the types of food that were prepared in a household. In IDIs, female participants acknowledged that their spouses were equally concerned about their children's health and would thus be involved in making certain dietary changes.

*"I learned how I should feed the child and the types of food to feed the child. They told us to feed children beans, boiled eggs, porridge mixed with pounded groundnuts, and bananas. I bought food which was recommended for a child. [After some time] I saw that my child was changing, he was growing tall... My husband was involved [in making the decision to change the Child's diet] ... We agreed that he should start buying the food that was recommended."* **IDI Community - Village ID\_199\_199033**

### 3.2.3 LEARNING AND BEHAVIOUR CHANGE

**Barriers to Behavior Change:** Due to economic challenges, some participants acknowledged that they faced challenges in ensuring that they provide fully for their children. They noted that during the dry season for example, they would take up extra work activities to make earnings meet like undertaking piece works from other people, selling some of their farm produce and fishing. They noted that it was sometimes difficult to afford some of the recommended foods to feed their children.

*"[During the dry season] We usually depend on farming and we make sure that our harvest must take us through until the other harvest of the following farming season. There are no other methods [used to find food during dry season], it is only through keeping enough farming products."* **IDI Community - Village ID\_199\_199005**

For other community members, they noted that to have constant supply of food in their households, they would ensure that they have enough food stored from the previous harvesting season. The participants narrated that whenever they had a bumper harvest, they would store adequate food that would last till the next farming season.

*I: When things become difficult during the hungry season, what are some strategies that you use to help your child get the foods they need to grow?*

*R: We do some piece work so that the children can have something to eat then us adults we eat mangoes so when mangoes finish, it becomes a challenge to find food.*

*I: Is there anything else apart from piece work?*

*R: Yes, we have a garden. We exchange tomatoes with maize or mealie meal. Some people would come to us and buy our produce just like that.* **IDI Community - Village ID\_199\_199045**

*M: Now during the hungry season, what methods do you usually use, to make sure that you continue to give your child the food he needs to grow?*

*P: We usually depends on farming and we make sure that our harvest must takes as through until the other harvest of the following farming season.*

*M: Ok a part from depending on your own farming products is there any other methods you use during the hungry season to secure food for your child.*

*P: No there is no other methods, it is only though keeping enough farming products. **IDI Community - Village ID\_199\_199005***

## 4. Discussion

The study generated several key findings. First, most caregivers in the study showed considerable knowledge on health, nutrition and child growth. Second, most participants were able to demonstrate how to use the growth charts to determine the growth rate of their children. Third, the study found that participants felt that they had substantial awareness of stunting, its causes and how it can be corrected in children under the age of five years. However, it was also apparent that some caregivers believed that short stature in children was primarily due to genetics rather than diet and therefore nothing can be done to address stunting. The study also revealed that some caregivers were not able to differentiate what they were empowered to do to address their child's stunting at home as opposed to what they should expect external actors and the local health system to do. Some caregivers thought the growth charts were only to be used by IPA staff and that it was not their responsibility to track the growth of their children. Lastly, the study also found that husbands have a very important role in decision making when it comes to purchasing more food for the household.

### 4.1 Determinants of Child Growth

The key finding that some caregivers believe that short stature in children is primarily due to genetics or God rather than diet and therefore nothing can be done to address stunting poses a critical challenge. Such beliefs could result in parents not adopting better feeding habits for their children. Future growth charts should clearly communicate that caregivers have the power to change the stature of their children if they are undernourished. The key will be to convey that even a little bit more in the child's diet can have great impact on growth. When caregivers believe their child's height is completely out of their control they have no motivation to augment the child's diet. Most parents in this study seemed to understand that their child's height is a mix of genetics and diet. When caregivers don't have the resources to improve their children's diets, emphasizing the genetics/god explanation may be a coping mechanism. This is how listing foods that are unattainable can backfire. The key is to reinforce that even with their resource constraints, they can still have a positive impact.

### 4.2 Lack of Community Buy-in

The finding that some caregivers thought the growth charts were only to be used by IPA staff and that it was not their responsibility to track the growth of their children indicates that some study participants did not take responsibility for the task of tracking the growth of their children but rather shifted the responsibility to IPA. This could be because of participants' feelings that the interventions were foreign and merely imposed on them. Some caregivers interviewed spoke of how they used the growth charts only because someone had asked them to use them and that they would come back to check. Furthermore, most

participants did not use the growth charts on non-study children because they thought that they were only meant for study children. This suggests that the growth charts may have significantly increased the focus on one specific child. Wider use of growth charts could be encouraged in the next phase. To tackle the problem of caregivers not being able to differentiate what they are empowered to do as opposed to what the system can do, charts should be refined to clarify parent empowerment based on community input. This should be done in order to get buy-in from the community.

### **4.3 Design of Growth Charts**

The third finding was that growth charts were considered easy to use and were understood by most caregivers. The participants noted that the language, illustrations and even the design used in the growth charts were very attractive. However, some participants felt the poster had certain food items that could not easily be acquired or accessed in a rural setting. Thus, they advised that a future design of the Growth charts should have food items that can be locally sourced or produced. It was also noted that some participants had problems interpreting what the color bands on the posters meant. Red and green were easily interpreted while yellow was a challenge. Most participants interpreted yellow as meaning that the child's height had improved. On the other hand, participants seemed not to have problems with interpreting the meaning of red and green. Potential modification could be to have only the green and red bands on the growth charts since most people can understand these without so many challenges. A few participants had expressed concern over not being able to get hold of anyone when they tried to call the number on the growth charts when they found that their children were falling in the red zone. Hence, there is also a need to think carefully about what families can do when some children fall in the red zone. The study also found that some participants felt that the children on the growth charts looked almost too healthy, and were an unattainable ideal, which might have had a demotivating effect. For the next poster designs, it would be necessary to pilot some new photos of Zambian children (the originals were stock photos found online).

### **4.4 The Husbands' Role in Decision-Making**

The study also found that husbands have a very important role in decision making when it comes to purchasing more food for the household. However, most men did not know how to use the growth charts. Men's limited knowledge on how to use the poster could result in limited willingness to support increased food acquisition. Since the study revealed that men are very involved in making decisions about buying more food for the households, it will be very beneficial to actively involve them in the next study both during the training and measuring height. The finding that men have limited knowledge on how to use the growth charts but are also very involved in making decisions to purchase more food for the household is a very important one. Since men are the primary providers in many homes, women's purchases are dependent on whether the husband has the money or not. Women only seem to play the role of purchasing food and preparing it.

## **5. Conclusion**

**The four main themes emerging from the study:**

1. **Male involvement in training and measuring height** – men have a critical role in decision making in regards to purchasing more food . This may imply that men could directly influence how much food is allocated to children.
2. **Caregiver empowerment based on community input** – it is critical to get buy-in from the community if caregivers are to fully accept the interventions.
3. **Nature versus nurture** – it is necessary to deliberately reinforce that even with resource constraints, caregivers can still have a positive impact on child growth.
4. **Design of growth charts** - Future modification could be to have only have the green and red color bands on the growth charts since most people can understand these without many challenges.

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