

CONTRIBUTION OF NUTRITION EDUCATION ON FEEDING BEHAVIOUR.

A CASE STUDY OF KARWASA VILLAGE, MUSANZE DISTRICT, RWANDA



A research project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfilment of the requirements for the degree of Master in Management of Development, specialization Rural Development and Food Security

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DEDICATION

First of all, I dedicate this work to my Almighty Father to whom all the glory goes. Secondly, to my late dad. Thirdly, I would like to dedicate this paper also to my beloved mum and sisters for their prayers and support, without their encouragement I would have not achieved this.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	ii
DEDICATION.....	iii
TABLE OF CONTENTS	iv
LISTS OF ACRONYMS AND ABBREVIATIONS.....	vii
ABSTRACT	viii
CHAPTER 1. INTRODUCTION	1
1.1 Background.....	1
1.2 Nutrition status in Rwanda	2
1.3 Rwandan government and nutrition	2
1.4 Intervening organizations to food security and nutrition in Rwanda	2
1.4.1 Main entities in charge of implementing the food and nutrition policy framework	2
1.4.2 Main technical and financial partners.....	3
CHAPTER 2. LITERATURE REVIEW	5
2.1 Defining Concepts	5
2.1.1 Nutrition education.....	5
2.1.2 Social and behaviour change	5
2.1.3 Behaviour change and nutrition education	5
2.1.4 Infants feeding definition	5
2.1.5 Minimum acceptable diet.....	6
2.1.6 Minimum dietary diversity	6
2.1.7 Minimum meal frequency	6
2.1.8 Stunting	7
2.1.9 Conceptual framework	7
2.1.10 Operationalization of the main concepts.....	8
CHAPTER 3. RESEARCH STRATEGY AND METHODOLOGY	9
3.1 Introduction.....	9
3.2 Study area.....	9
3.3 Research design.....	10
3.4.1 Case study.....	10
3.4.2 Data collection.....	11
3.4.3 Secondary data.....	13

3.5 Data Analysis	13
3.6 Ethical consideration	13
3.7 Limitation of the study	14
CHAPTER 4. RESEACH FINDINGS	15
4.0 GHI Health center program training details	15
4.1 Profile of the respondents	15
4.2 Hygiene and sanitation	15
4.2.1 Trained mothers	16
4.2.2 Non trained mothers	17
4.2.2. Practice of hygiene and sanitation	17
4.2.3 Observation of hygiene practices	18
4.3.1 Trained mothers	19
4.3.2 Non-trained mothers	20
4.3.3 Group discussions	21
4.4.1 Trained mothers	21
4.4.2 Non-trained mothers	23
4.5.1 Trained mothers	25
4.5.2 Non-trained mothers	25
CHAPTER 5. DISCUSSION	27
5.1 Hygiene and Sanitation	27
5.2 Breastfeeding	27
5.3 Feeding practices	27
5.4 Infant Dietary Diversity	28
CHAPTER 6. CONCLUSION AND RECOMMENDATION	29
6.1 CONCLUSION	29
6.2 RECOMMENDATION	30
REFERENCE	32
APPENDIX	34
ANNEX 1	34
PERSONAL REFLECTION ON FIELD RESEARCH	34
ANNEX 2	36
Data collection questionnaire	36
ANNEX 3	40

Respondents profile	40
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List of Figures

Figure 1: conceptual framework.....	7
Figure 2:Map of Republic of Rwanda indicating Musanze district, Cyuve sector where the study was undertaken.....	9
Figure 3The figure below shows the research framework	10
Figure 4Table illustrating the source of information on hygiene and sanitation for trained and non-trained mothers	Error! Bookmark not defined.
Figure 5:Researcher observing toilets facilities	18
Figure 6: interview with respondents	20

List of Tables

Table 1:WHO definitions for infant feeding.....	5
Table 2: Breastfeeding knowledge.....	18

LISTS OF ACRONYMS AND ABBREVIATIONS

FAO	The Food and Agriculture Organization of the United Nations
GHI	Garden for Health International
NGO	Non-governmental Organization
RDHS	Rwanda Demographic and Health Survey
UNICEF	The United Nations Children's Fund
USAID	The United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WFP	World Food Program
WHO	World Health Organization

ABSTRACT

Garden for Health international (GHI) has been offering nutrition education to mothers in order to prevent chronic malnutrition. The training offered cover different topics related on feeding practice like hygiene and sanitation, breastfeeding, complementary feeding and dietary diversity. The aim of the training was to improve the nutrition status of children under 5 years old through the changing behaviour of their mothers feeding practice. However, GHI lacks information on whether those training has been effective to the community of Karwasa Village, Musanze district, Rwanda where the program were implemented.

Data was collected using semi structured questionnaire, key informant interviews, group discussion, and observation. These tools were applied on thirty (30) respondents (15 trained mothers and 15 non trained mothers), 3 key informants and two (2) group discussion. The results showed that trained mothers are more knowledgeable on nutrition and feeding practice than non-trained mothers, however the study revealed a gap between knowledge and practice.

In terms of feeding, the results of this study showed that trained mothers understand the right type nutrition for children. Children under 6 months of age are usually exclusively breastfed, most of them respondents introducing complementary foods at 6 months or between 6 and 12 months for both trained and non-trained. When complementary feeding is introduced, households with different economic capacities feed their children differently. However, the non-trained mother showed to have knowledge from women group discussion which showed to be important on feeding behaviour of non-trained mothers. The results show a great need for community education.

This report recommends to better educate mothers with practical session on how to feed for their children and to educate fathers more about the importance of their involvement in child care. Community leaders and health workers can be used to pass along messages on child care, in addition to existing community forums where child care issues are discussed.

Key words; Nutrition education, feeding behaviour, chronic malnutriti

CHAPTER 1. INTRODUCTION

This research seeks to explore the contribution of nutrition education on behavior change of people living in Musanze district, Cyuve sector, Karwasa Village with the aim of recommending strategies for improving food security programs particularly aimed at stunting reduction in children under five. This research is reported in six chapters; introduction, literature review, research methodology, findings, discussion, conclusion, and recommendation. The introduction provides a background and other context issues relating to the study, together with problem statement, research objective, and research question. The literature review chapter reviews and discusses relevant concepts related to the research topic. In the methodology part, the study area, research design, research strategy, data collection tools and method of data analysis are indicated. The findings chapter contains the important issues identified during data collection in the field. The discussion chapter provides a comprehensive analysis of the issues identified during the data collection. The conclusion and recommendation chapter explain a general overview of the study and propose the ideas on how the issues identified in the study could be settled.

1.1 Background

Stunting is the most widespread form of undernutrition in children under 5 years old (Onis et al., 2016). According to UNICEF, WHO and the World Bank (2016), 155 million children under five were stunted (low height-for-age) globally in 2016; where 38% of them were from Africa and 56% from Asia. It was predicted that 127 million children under 5 years old will be stunted in 2025 if the current trend in stunting continues (WHO, 2015). That is, 27 million more than the WHO's global target for reducing stunting by 2025 or reduction of only 26% (Onis et al., 2016). Children are defined as stunted when they have a low height/length-for-age more than two standard deviations below the WHO Child Growth Standards median (Onis 2006).

Despite the targets of World Health Assembly to reduce worldwide stunting rates with 40% by 2025, Africa continues to be the only region where stunting rates are still increasing rather than decreasing, with a total of 58 million children under five years old being stunted or overweight (International Food Policy Research Institute, 2016).

Similar to many other African countries, Rwanda also faces nutritional challenges and has high rates of stunting. Rwanda Demographic Health Survey (RDHS, 2014-2015) reported that, 38% of children under the age of 5 are stunted, and 14% are severely stunted (DHS, 2015). According to UNICEF Conceptual Framework the causes, consequences and factors influencing stunting in children in developing countries are grouped in: household and family factors, low level of education, inadequate complementary feeding, breastfeeding, and infections (Stewart et al., 2013). However, in Rwanda, the most important factors associated with stunting are found to be: poor quality and availability of food, repeated illness and poor health care, lack of knowledge on feeding practices, and inadequate "water, sanitation and hygiene" (WASH) access (Lu et al., 2016).

According to M Shekar et al., (2017) investment in human capital is crucial for successful intervention to reduce stunting in children under five. Berti et al.; (2004), therefore states offering nutrition education alongside the implementation of nutritional gardens is essential for a reduction in the prevalence of stunting which can be sustained over the years. Much research on kitchen gardens has been done, yet the contribution of education in nutrition to reducing stunting is less well-known (Musotsi et al.; 2008).

Therefore, in order to know the effectiveness of the nutrition education through "health center program" implemented by GHI, the present study will identify the contribution of nutrition education on feeding behaviour in the community of Musanze district, Rwanda and more knowledge on this is essential to support effective interventions of Garden for Health International on nutrition sensitive program and may contribute to provide lasting solutions to chronic malnutrition.

1.2 Nutrition status in Rwanda

Like many African countries, Rwanda faces nutritional problems and high rates of malnutrition. Stunting was observed in up to 38% of children under five in 2015 (International Food Policy Research Institute, 2016). Sixteen percent of children are stunted at six months of age and this number increases with age as complementary foods are introduced. While breastfeeding rates are generally high in Rwanda, 13% of infants under 6 months of age already receive complementary foods and fluids, despite WHO's recommendations for exclusive breastfeeding in the first 6 months of life. (Kramer & Kakuma, 2012; National Institute of Statistics of Rwanda, Ministry of Health [Rwanda], & ICF International, 2015). Moreover, staple foods such as tubers, roots, cereals, and legumes are often an inappropriate supplemental food model with incomplete nutritional values. Only 29% of children aged 6 to 23 months reach the minimum score of dietary diversity and only 18.6% consume a minimum acceptable diet, as defined by the WHO IYCF indicators (National Institute of Statistics of Rwanda et al., 2015). The period from conception to age 2 is recognized as the most critical for child development (Prendergast and Humphrey, 2014). Although catch-up can take place at a later age, the first 1000 days after conception seem to be the most important for the future of child health (Prendergast and Humphrey, 2014).

1.3 Rwandan government and nutrition

Increasingly aware of the urgency of the situation and the need to promote multi-sectoral action, the Government has set an ambitious goal of reducing under-five stunting by 18% by 2018 (HSSP III). This commitment is in line with SDG objective to end hunger (Goal 2) and all forms of malnutrition by 2030 (Goal 2.2). It also reflects the goals of Rwandan Vision 2020 and EDPRS II, which correctly place nutrition and food security as fundamental issues for national development. In order to provide advice on nutrition interventions and to better coordinate ministries and development partners with capacities and responsibilities to improve nutrition, a first national nutrition policy was developed in 2007. A second food and nutrition policy and a strategic plan for 2013-2018 was then developed by the government to guide the identification and management of child under-nutrition at the subnational level; roll back multisector district plans; and provide a framework for coordinating community programs (UNICEF, Rwanda 2017).

1.4 Intervening organizations to food security and nutrition in Rwanda

1.4.1 Main entities in charge of implementing the food and nutrition policy framework

At national level. Government ministries typically lead the implementation of activities at the national and district levels. The main ministries responsible for the implementation of the National Multi-Sector Strategy to Eliminate Malnutrition in Rwanda (NSEM) are the Ministry of Health, the Ministry of Agriculture, the Ministry of Education, the Ministry of Local Government and the Ministry of Gender and Family Promotion. In order to fulfill their commitment, the five ministries prepare an annual plan of Joint Action to Eliminate Malnutrition (JAPEM) as a national platform to help monitor and support the implementation of the NSEM through the DPEMs. Joint Action Plan helps districts implement their respective district plans to eliminate malnutrition (RNCP, 2013).

At the decentralized level. District mayors are responsible for eliminating malnutrition and coordinating nutrition activities. In order to make the NSEM operational, the Ministry of Health and its partners began the process of developing District Plans to Eliminate Malnutrition (DPEMs). This process was concluded in the 30 districts in November 2011 with the culmination of the second annual nutrition summit (RNCP, 2013).

In hospitals, the hospital director and a nutritionist are responsible for implementing the nutrition program, while the district agronomist is responsible for the food security component (RNCP, 2013).

1.4.2 Main technical and financial partners

UN Agencies

United Nations organizations are collaborating with the multisector / multi-stakeholder platform. It is an integral part of the Development Partners Group (DPG) and Nutrition Technical Working Group (TWGs) where it provides technical leadership and financial assistance. The United Nations system is actively involved at the multisector level through the nutrition technical working group hosted by the Ministry of Health. It also participates in the technical working group on food security and nutrition, hosted by the Ministry of Agriculture. It supports strategic planning and analysis, advocacy, monitoring and evaluation, and knowledge sharing to strengthen nutrition and food security (RNCP, 2013).

Multilateral/bilateral organizations

Donors collaborate with the multisector / multi-stakeholder platform through Nutrition Technical Working Group. They also have their own distinct platform, the Development Partners Group (DPG) as a health sector (not limited to the nutrition sector). The DPG Health Group is a convening group of donors and non-governmental health development partners in the Health Sector Group chaired by USAID (RNCP, 2013).

Local & International NGOs

NGOs supporting nutrition are coordinated by the Technical Working Group on Nutrition (NTWG). They usually operate at the district level to implement specific nutrition activities directly or through implementing partners (RNCP, 2013).

Gardens for Health International (GHI)

Gardens for Health International (GHI) is a non-profit American organization that seeks to provide sustainable agricultural solutions to the problem of chronic child malnutrition. The organization works in partnership with rural health centers in the Gasabo and Musanze districts of Rwanda to provide families facing malnutrition with seeds, livestock and know-how, to transform the dependence of food aid in prevention and autonomy. GHI works on both health and agriculture to address the root causes of malnutrition and invest in the productivity of the families it serves (GHI, 2010). The program is aimed at children under five suffering from malnutrition. In almost all cases, these caregivers are women (GHI, 2010). GHI works with every family in the garden program, and qualified field staff visit every family in their home, helping them design a garden that meets the specific needs of each family, with a special focus on dietary diversity of the household. In addition to targeted agricultural assistance, each family participating in the GHI program participates in a fourteen-week training course on health and nutrition, including breastfeeding, complementary feeding practices, hygiene and dietary diversification (GHI, 2010). GHI has several programs including health center program, antenatal care program, our farm, and turikumwe fund. In this research we focus on the Health center program which is discussed below.

GHI health center program

Health center program is a combination of integrated nutrition and agriculture program for vulnerable smallholder families with the aim of tackling two interrelated challenges facing vulnerable families which are lack of access to diverse, healthy food and a lack of education around proper nutrition. However, health center program is where the linkage of healthcare systems that ensure families are equipped with the knowledge to make informed decisions around the children's nutrition and food systems that ensure all families have access to a diverse array of nutritious foods are putted into action

(GHI, 2014). GHI works with 20 health centers in three districts of Rwanda to implement integrated nutrition and agriculture programming for vulnerable smallholder families. The program contains a 14-week health training program that addresses the many factors other than household food production that can contribute to malnutrition. The health program provides families with the comprehensive knowledge they need to fight malnutrition from every angle. The courses module on antenatal and postnatal education are provided for example hygiene and sanitation, breastfeeding, complementary feeding and dietary diversification (GHI, 2010).

1.5 Problem statement

Garden for Health International (GHI) seeks to fundamentally change the clinical treatment of malnutrition (stunting) by supporting families to establish nutritious kitchen gardens at their homes, while also equipping them with the knowledge they need to keep their children healthy in the long-term (GHI, 2010). It has been reported that nutrition education alongside the implementation of nutritional gardens is essential for a reduction in the prevalence of stunting (Berti et al.; 2004).

According to Musotsi et al.; (2008), the impact of nutritional gardens has been proven positive and GHI also claims that nutrition garden activities is able to improve nutrition for mothers, children and other family members by enhancing household dietary diversity. Yet, GHI lack information on how nutritional education that are provided to its beneficiaries is affecting people's behavior on feeding practices in Musanze district, Cyuve sector, Karwasa Village. Therefore, this study will focus on the effect of nutrition education on feeding behavior change in Musanze District, Cyuve sector, Karwasa Village, in Rwanda and the recommendation about strengthening the health center program and the follow up of the program beneficiaries will be given to Garden for Health International for the future interventions on nutrition education.

Problem owner

Gardens for Health International: A NGO which works at the intersection of health and agriculture to reduce rates of chronic childhood malnutrition in Rwanda.

1.6 Research objective

The objective of this research is to assess the impact of nutrition education on feeding behaviour in the community of Musanze district, Rwanda with the aim of recommending strategies for improving food security programs particularly aimed at stunting reduction in children under five. GHI will get recommendations on how to make its food security interventions in the Musanze district community more effective.

1.7 Main question

How is nutritional education affecting people's behaviours on feeding practices in Musanze district, Cyuve sector?

Sub research questions:

1. What is the contribution of nutritional education to household hygienic condition?
2. What are the effects of nutrition education on breastfeeding of children between 0-2 years old?
3. What are the effects of nutrition education to complementary feeding practices?
4. What are the contribution of nutrition education to infants' dietary diversity?

CHAPTER 2. LITERATURE REVIEW

The chapter reviews nutrition education in context of behaviour change, the knowledge and practice of mothers in context of hygiene and sanitation, breastfeeding, feeding practice and dietary diversity. The chapter climaxes with views on strategies that policymakers and institutions can use to reduce chronic malnutrition.

2.1 Defining Concepts

2.1.1 Nutrition education

According to Gil (2010), nutrition education is set of planned educational activities targeted at certain population groups and aimed at acquiring healthy nutrition behaviours. Nutrition education include also various types of actions aimed to change knowledge, attitudes and behaviours of individuals, groups of individuals or populations to contribute to the prevention and control of malnutrition in all its forms (Mataix Verdú, 2000).

2.1.2 Social and behaviour change

Social and behavior addresses the behavioural, social and cultural factors related to individual and population health to promote and sustain healthy environments and healthy lives for individuals and populations (C-Change, 2012). Moreover, according to van der Linden, S. (2013) social behaviour change is well explained with the behaviour change theories which cite personal, and behavioural characteristics as the major factors in behavioural determination, and these theories are often used in the sectors of health, education and international development with the hope that the understanding behaviour change should improve the services provided in these sectors.

2.1.3 Behaviour change and nutrition education

Socio-cultural beliefs, customs and attitudes towards feeding practice have a huge impact on infants' nutrition and the dietary status of their mothers. Customs and beliefs can also relate to breastfeeding, hygiene and sanitation that are considered an essential part of feeding practice. According to Shi and Zhang (2011), nutrition education has had a positive impact on improvement of complementary feeding practice and child growth, and has also been found to be effective in changing dietary practice that affect malnutrition (Ammerman et al., 2003).

2.1.4 Infants feeding definition

Table 1:WHO definitions for infant feeding

Feeding category	Definition	Infant receives	May include	Does not include
Exclusive breastfeeding	The proportion of infants 0–5 months of age who are fed exclusively with breast milk.	Breast milk (including milk expressed or from a wet nurse)	ORS, drops, syrups (vitamins, minerals, medicines)	Anything else

Predominant breastfeeding	Means that the infant's predominant source of nourishment has been breast milk	Breast milk (including milk expressed or from a wet nurse) as the predominant source of nourishment	Certain liquids (water and water-based drinks, fruit juice), ritual fluids and ORS, drops or syrups (vitamins, minerals, medicines)	Anything else (in particular, non-human milk, food-based fluids)
Breastfeeding	Normal way of providing young infants with the nutrients they need for healthy growth and development.	Breast milk (including milk expressed or from a wet nurse) and solid or semi-solid foods	Anything else: any food or liquid including non-human milk and formula	NA
Bottle-feeding	The practice of feeding an infant a substitute for breast milk	Any liquid (including breast milk) or semi-solid food from a bottle with nipple/teat	Anything else: any food or liquid including non-human milk and formula	NA
Complementary feeding	The process of feeding baby other foods and liquids in addition to breast milk from 6 months onwards	Breast milk (including milk expressed or from a wet nurse) and solid or semi-solid foods	Anything else: any food or liquid including non-human milk and formula	NA

Figure 1 WHO definitions for infant feeding

Source: WHO definitions for infant feeding (WHO, 2008)

2.1.5 Minimum acceptable diet

Minimum acceptable diet is when a child meets the minimum feeding frequency and minimum dietary for its age group. The “minimum acceptable diet” indicator measures the proportion of infants of 6 to 23 months who get a minimum acceptable diet, beside breast milk (WHO, 2007).

2.1.6 Minimum dietary diversity

Minimum dietary diversity is the proportion of children between 6 to 23 months of age who receive foods from 4 or more food groups out of the total of 8 following food groups (Grains, roots and tubers; Legumes and nuts; Dairy products (milk, yogurt, cheese); Fresh foods (meat, fish, poultry and liver/organ meats); Eggs; Vitamin-A rich food; fruits and vegetables; food cooked in oil or fat (WHO, 2007). The foods which are mainly given to children in Rwanda at this age category include: spinach, porridge, milk, yoghurt, fruits, cereals, roots and tubers.

2.1.7 Minimum meal frequency

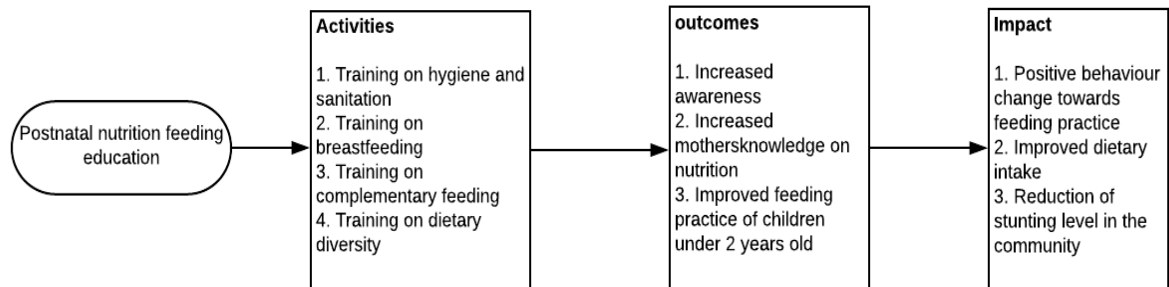
Minimum meal frequency for breastfed children is defined as 2 (two) or more feedings of solid, semi-solid, or soft food for children of 6-8 months and 3 (three) or more feedings of solid, semi-solid or soft food for children between 6 to 23 months (USAID, 2010). However, for non-breastfed children the minimum meal frequency is 4 (four) or more feedings of solid, semi-solid, soft food, or milk feeds for children between 6 to 23 months (USAID, 2010).

2.1.8 Stunting

Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median (WHO, 2007).

2.1.9 Conceptual framework

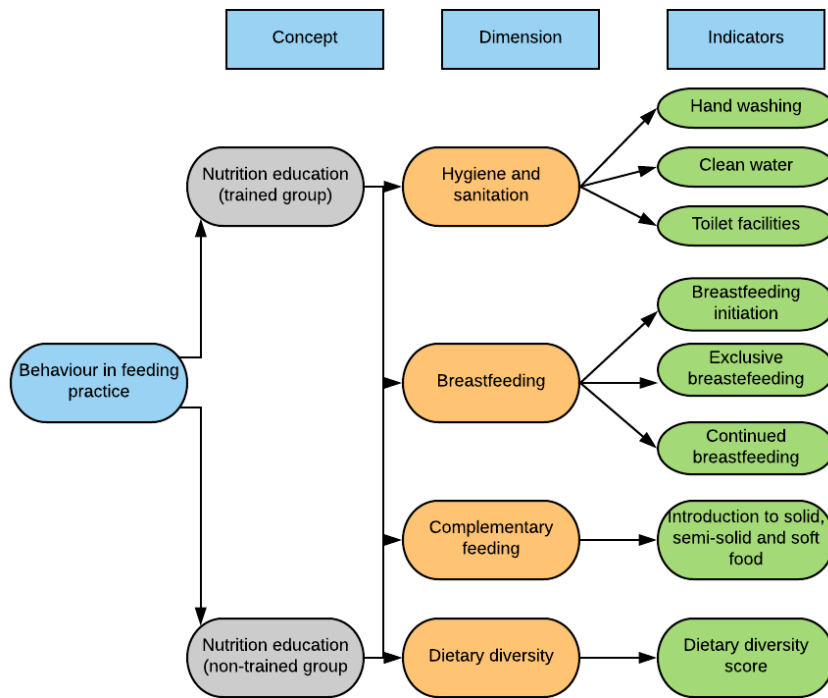
Figure 2: conceptual framework



Source: Author, 2018

The conceptual framework was set up using result chain logical framework typical of result based management as shown above. This shows a way of identifying different indicators which help to identify the impact. The training activities were well defined and form a basis of expectations in terms of long and short term outcomes. The outcomes desired were increased awareness on nutrition, increased mothers' knowledge on nutrition and improved feeding practice of children under 2 years old. Through these outcomes the community (mothers with children under 2 years old) will result in positive behaviour change towards feeding practice, improved dietary intake, reduction of stunting level in the community.

2.1.10 Operationalization of the main concepts



Source: Author, 2018

CHAPTER 3. RESEARCH STRATEGY AND METHODOLOGY

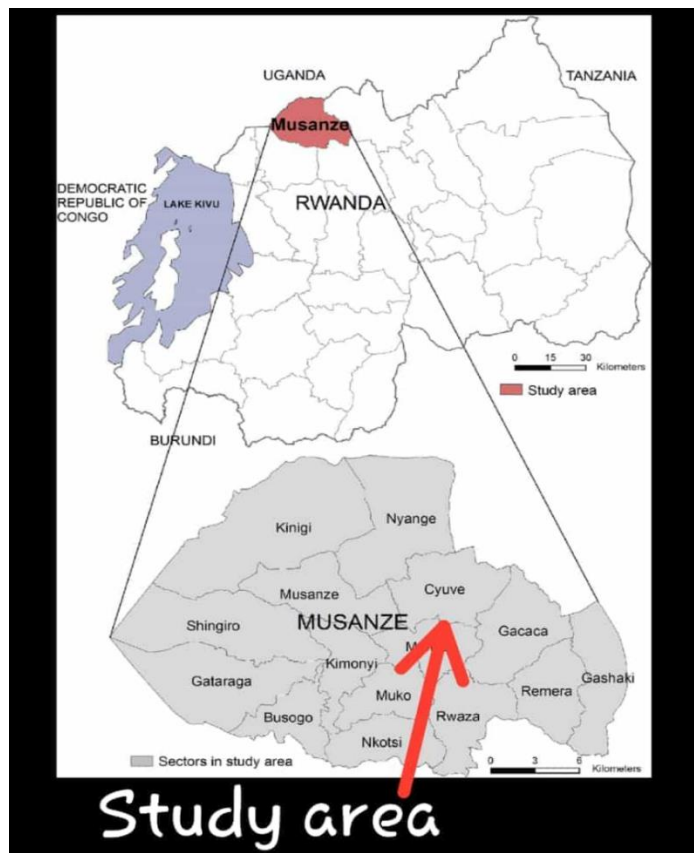
3.1 Introduction

This chapter provides information about the study area and the methodology used in this study which covers the research design, research strategy, data collection, data collection tools, sampling, data analysis, ethical consideration, and limitations of the study.

3.2 Study area

Karwasa village located in Musanze District, Cyuve sector was selected by the GHI officials as the study area because of its high prevalence of chronic malnutrition (stunting) and is one of the village in which GHI has implemented health center program through Karwasa Health Center. Musanze district is located in Northern Province of Rwanda with the population of 368, 267 and the density of 694 habitant/Km² (RDHS, 2014-2015). Musanze is bordering Uganda and Democratic Republic of Congo (DRC) through Rwanda Virunga National Park and it is among of the districts with high number of stunting level where 38% of children under age of 5 are stunted (RDHS, 2014-2015). Therefore, the above mentioned area has been selected as the place in which this study will be conducted.

Figure 3:Map of Republic of Rwanda indicating Musanze district, Cyuve sector where the study was undertaken.

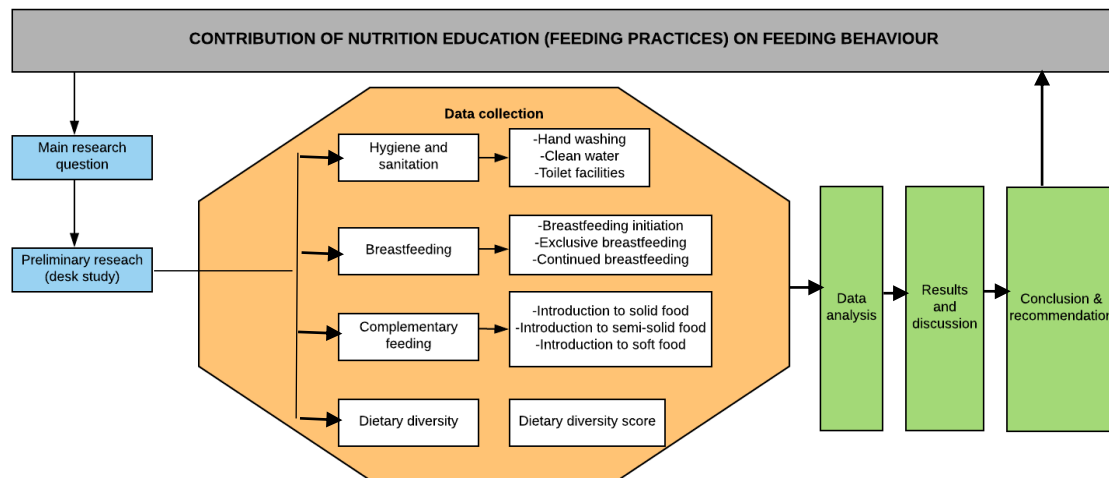


Source: NISR,2013

3.3 Research design

The design of this study was based on researcher's framework as the tool to be applied in assessing the behaviors on feeding practices of infant between 0 to 2 years old. Data pertaining hygiene and sanitation, breastfeeding, complementary feeding practices, and infants' dietary diversity will be collected. The research framework below shows brief passage of the study. The research started by defining the main research question, preliminary research (desk study), data collection and at the end, based on the data analysis, results and discussion, conclusions and recommendations will be drawn.

Figure 4 The figure below shows the research framework



Source: Author, 2018

3.4 Research strategy and approach

3.4.1 Case study

This research strategy is a case study. A case study is a research strategy in which the researcher tries to gain a profound and full insight into one or several objects or processes that are confined in time and space (Verschuren et al., 2010). Karwasa village has been chosen as a case because:

- This area has high prevalence of chronic malnutrition,
- It is the area in which GHI Health center program was implemented,
- The Organization representatives are based in that area and the researcher is very familiar with the area, so it was easy for him to enter the community and get the necessary information easily.

This research used qualitative type of data collection and analysis. The approaches were informed by the research objective, which required in-depth understanding of behavior on feeding practices of mothers/caregivers residing in Musanze district, Cyuve sector, Karwasa village. Different methods of qualitative data collection were used to collect data from different sets of respondents: interviews, focus group discussions, observation and dietary diversity score has been recorded.

Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem, so the chosen strategy will allow respondents to express freely on the feeding practice of their child and their reaction on the nutrition education program (Verschuren et al., 2010). In the data collection process, the triangulation of information from different methods, techniques and sources of research was used to improve validity and reliability of the results of the research. Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of the phenomena (Carter et al., 2014).

3.4.2 Data collection

Data were collected through primary and secondary source.

Primary data:

Primary data about hygiene and sanitation, breastfeeding, complementary feeding practices, and infants' dietary diversity were collected through face-to-face interviews with individual respondents and, group discussion and by means of observation. Data collected were coded, triangulated and analyzed. The strengths of using primary data, lies in its nature that takes the research to the source in order to collect the empirical data. It also provides the researcher with first-hand information and observation of issues and the area of study. Some of its weaknesses, it can be costly and time consuming (JJ Hox, HR Boeije 2005).

Data collection tools

Prior to data collection different tools were chosen according to what are coherent with research problem, objective and question; way of communication; way of recording and analyzing; how the sensitive issues can be dealt and the tools which are supported by the literature review.

The different tools that have been used for data collection include:

1. Desk study
2. Semi-structured interview guide
3. Group's discussion guide (check list)
4. Key informant interview guide
5. Observation
6. Infants' dietary diversity score questionnaire

Before conducting the interview, the researcher has done a pre-test interview and a focus group discussion to explore the understanding of the respondents in answering the questions correctly. The pre-test has helped the researcher to identify some weaknesses in the questionnaire and he readjusted the new questionnaire.

Semi-structured interview

The semi structured interview was used to collect information from the mothers/caregivers about hygiene and sanitation for themselves and in the household; breastfeeding knowledge and practices; and the complementary feeding practice of the infants. This interview was conducted to the mothers who were beneficiaries to GHI health center program for those who are not. The interview session was conducted using a questionnaire that was developed after pre-test interview. The interview was conducted in local language "Kinyarwanda" since the researcher speaks it and the information were translated into English (Annex1).

Group Discussion

The researcher conducted group discussion with two different groups. A sample of maximum 12 representative lactating mothers of program beneficiaries and non-beneficiaries. Another group discussion was with 8 officials (local leader, 2 health workers, head of Karwasa health center, GHI district coordinator, social affairs officer, development agent in the village, and leader of women group in the village). In this research, group discussion was used to gather information from the respondents (trained and non-trained group) with the focus of pre-testing and reformulating the semi structure questionnaire to be used in semi-structure interview. It was organized in a such manner that all perspectives of the discussed topics were covered. In addition, the focus group was used also to know what are the views and challenges of nutrition program on the side of implementation and the behaviors of the community towards nutrition programs. During group discussions, recordings and notes were taken. The notes and the recording were used to produce grids for analysis and report writing.

The aims of conducting group discussions by these different group were meant to allow the researcher to have an understanding about different views from the respondents on nutrition education such as the view and experience towards nutrition knowledge and to adjust the questions which are in line with the research question. This method stimulated thinking and allowed the researcher to collect as much data as possible by ensuring fair and equal participation of all participants without dominance by particular community or staff members.

Key informant interview

The key informants for this study were a representative of Ministry of Health at the district level who is responsible for nutrition. Additional information about the project such as success stories, and the challenges experienced during implementation period were collected from a second key informant stationed at the project coordination at the district level. The information and the issues related on hygiene and sanitation, breastfeeding and feeding practice were collected from the health worker based at Karwasa health centre.

Observation

The observation tool was used to observe what is happening in the households concurrently with individual interviews and group discussions. The researcher observed the presence of nutritional kitchen garden, the meals prepared in the visited households and the presence of soap, places where the dishes and cooking materials were kept, and type of toilet, as indicators of hygiene in households and others activities which is directly and indirectly linked to feeding practices.

Infants dietary diversity assessment

Information from the interactive 24 hours' food recall was used to generate number of food groups consumed by children. A structured questionnaire was used to record type of meals consumed by children in the previous 24 hours. Meals of each child were separated into their ingredients and the number of food groups consumed generated as recommended (Dewey et al., 2006). The infants' food groups include: (1) grains, roots or tubers; (2) Vitamin A-rich plant foods; (3); *fruits or vegetables*; (4) *meat, poultry, fish, seafood*; (5) *eggs*; (6) *Pulses, legumes, nuts*; (7) milk and milk products, (8) foods cooked in oil or fat (FANTA: Anne et al, 2006). To gather these information, the researcher asked the person who feed the children in 24 hours who were mostly the mothers.

3.4.3 Secondary data

Secondary data were collected through a desk study by reviewing various documents including and not limited to books, policy documents, journals, internet sources, governmental reports and the report from international organizations like UNICEF, FAO and WHO. Secondary data helped in reviewing existing information, theories and views of different authors for better understanding of the study area and various subject matters and key concepts covered under the study it was also used as a source for defining and operationalizing the key concepts used in the study.

Sampling

For this research, purposive and random sampling techniques were used, focus group and survey respondents respectively. Together with Karwasa health center worker, the fifteen (15) non-trained mothers/caregivers with children of 0-2 years old were randomly selected from health center report of the mothers in Karwasa village. The other fifteen (15) trained mothers/caregivers with children of 0-2 years old were purposively selected based on the year of graduation. The GHI monitoring officer provided a list of families who enrolled in the year of 2017 season B (season B starts with the start of the month of February of each year) and the researcher selected randomly 15 mothers to participate in the study.

For the focus group and survey respondents, having a baby between 0-2 years old, being in the same social welfare (ubudehe) and to at least have a basic education (knowing how to read and write) were the factors that has been considered to avoid bias of the findings. A total of fifteen (15) trained mothers/caregivers with children of 0-2 years were picked from GHI health center program beneficiaries and the other total of fifteen (15) non trained mothers were picked from Karwasa village.

The key informants were identified, and interviewed by using semi structured questionnaire. The group discussions meetings were held separately. One group of lactating mothers another for the officials in different department but linked to health and nutrition. For group discussion with the lactating mothers, twelve (12) mothers' representative formed a discussion group and eight (8) officials and leaders formed also their discussion group. The observation, were conducted alongside interviews and for the home visit. For the infants' dietary diversity, the assessment was conducted for all 30 respondents (non-trained and trained mothers).

3.5 Data Analysis

Analysis of the data was done using qualitative thematic content analysis technique. The data collected was first transcribed and read to identify meanings and coded systematically. Once all the meaning unit were identified, data were organized and selected according to which are in line with the research question (relevant ones). Then were displayed in terms of themes within the matrix and they were presented and analyzed (interpreted) in a qualitative manner to bring out prevailing opinions of the respondent.

3.6 Ethical consideration

In order to get the respondent trust before the interview, I introduced myself to them, the research I am doing and its purpose has been explained. I guaranteed them that their anonymity will be taken into consideration. I got their informed consent by letting them know that they have the right to participate only if they want. The respondents were also assured that the care will be taken to ensure that no information collected will be accessed by anyone except the researcher.

3.7 Limitation of the study

One important limitation of the study was the expectation of the respondents. At the start, the GHI program beneficiaries tried to impress the researcher by showing the right side of what they know and practice; and on the other side of non-trained mothers they thought the researcher was coming to select new mothers to be trained for the next intake. However, the researcher explained the reason and purpose of the research and their anonymity were guaranteed. The local leader helped also in explaining the researcher's reason to be in the community which was a good strategy for the researcher to gather correct and trusted information in safe way. Yet, the research outcome cannot be generalized because the research was a case study.

CHAPTER 4. RESEACH FINDINGS

In this chapter, the findings of this study are presented. The data from the study were structured according to the research sub-questions.

4.0 GHI Health center program training details

GHI as an international organization work with Health centers to tackle malnutrition especially stunting among children under the age of 5. Based on the local health center data, every intake they select 40 families with children who are likely to be undernourished and they provide training for 14 weeks with one attendance per week. All the respondent mothers who were beneficiaries of GHI attended the training one hundred per cent. The training is attended only by women because are the ones who always take care of child in that community. The training curriculum cover various topic like, hygiene and sanitation, breastfeeding, complementary feeding, and dietary diversity (cooking demonstration). All the training, according to respondent they are theoretical with the poster demonstration and visual materials except cooking demonstration where a chosen households host the trainee for the cooking demonstration. The main themes that have been covered in the in breastfeeding: importance / benefits of breastfeeding, infant feeding signals, breastfeeding (catch and position, techniques, etc.), common concerns about breastfeeding and how care, breast care / personal care, indications that breastfeeding is effective (signs of sufficient milk supply), the importance of exclusive breastfeeding for the first six months after birth, and prolonged breastfeeding for two years or more. For the feeding practice the topic which covered are timely introduction of solid and fluids, type of foods to be introduced at every stage of children while in hygiene and sanitation the topics on hand washing with soap, changing babies, breast and the baby hygiene are covered. During the dietary diversity, in addition to cooking demonstration, they learn the importance and how to cook the food with 4 colors (diversified food) and the implementation of kitchen garden

4.1 Profile of the respondents

This research targeted 30 others who have children between 0-2 years old, who are in the same social welfare (ubudehe) category and with some basic education (knowing how to read and write). Half of the selected mothers were GHI health center program beneficiaries and another half of the mothers were non beneficiaries, the attached annex shows age, marital status, occupation, family size and the number of children (Annex 3).

Characteristics of respondents in Karwasa village, Author: 2018

4.2 Hygiene and sanitation

In this part, the researcher collected data about household hygiene and sanitation. The sub question was ***“what is the contribution of nutrition education to household hygienic condition?”***

To know the mothers’ understanding of hygiene and sanitation, they were asked what they think should be done to maintain proper hygiene of themselves, their children and in the household and where they get that information. During each household visit, the researcher observed some of activities done to maintain the proper hygiene.

The table below indicates the answers given by mothers both trained and non-trained and their numbers in what they know and what they claimed to practice without a direct observation of the researcher.

Trained mothers			Non-trained mothers		
Answer	Household		Possible answer	Household	
	Knowledge	Practice		Knowledge	Practice
Washing hands with soap before feeding a child or preparing food	15 out of 15	9 out of 15	Washing hands with soap before feeding a child or preparing food	14 out of 15	3 out of 15
Washing hands with soap after using a toilet	15 out of 15	5 out of 15	Washing hands with soap after using a toilet	7 out of 15	0 out of 15
Cleaning toilet	15 out of 15	4 out of 15	Cleaning toilet	15 out of 15	2 out of 15
Keeping water and soap for washing hands at the toilet	15 out of 15	2 out of 15	Keeping water and soap for washing hands at the toilet	7 out of 15	0 out of 15
Keeping the mothers and the children's clothes clean	15 out of 15	12 out of 15	Keeping the mothers and the children's clothes clean	9 out of 15	4 out of 15
Keeping cooking materials clean	15 out of 15	7 out of 15	Keeping cooking materials clean	6 out of 15	3 out of 15
Disposing of children's faeces in the toilet	15 out of 15	12 out of 15	Disposing of children's faeces in the toilet	4 out of 15	2 out of 15

Figure 5 Answers given by the respondents on hygiene and sanitation

Source: Author, 2018

4.2.1 Trained mothers

4.2.1.1 Knowledge and attitude of hygiene and sanitation

All trained participants reported to have heard and trained about hygiene and sanitation. The GHI health center program was the common source of information reported by the respondents, followed by health community meeting and one to one information. Among the group of GHI program beneficiaries, sources of hygiene education reported were fourteen-week training, and community meetings. The level of knowledge about how to keep personal hygiene and household hygiene all the respondents reported that you have to wash your hands before feeding children or preparing food; after using the toilet; keeping water and soap for washing hands at the toilet; bathing; and keeping the mothers and the children's clothes clean. In addition to that they reported also that the cooking materials must be cleaned, together with the toilets and faeces of the children must also be disposed in toilet.

4.2.1.2 Practice of hygiene and sanitation

Among all the activities done by the program beneficiary (trained mothers) related to hygiene, the data shows differences between knowledge and practices. 15 out of 15 trained mothers knows exactly what

to do to maintain proper hygiene. Yet, there is a big difference between knowledge and practice for example to keeping water and soap for washing hands at the toilet where only 2 out of 15 do this, and for the visited households only 5 out 15 trained mothers claimed to washing their hands with soap after using a toilet or changing their children, while 9 out 15 respondents claimed to wash their hands with soap after using a toilet. None of the respondent reported to wash hands without soap. Almost all the visited household had not cleaned toilet, only 4 out 15 toilets were cleaned, but disposing children's faeces in the toilet are among the activities that are more practicable. Regarding the hygiene of cooking materials through the researchers' observation they were 7 out 15 households who keep their cooking materials washed.

"Water is a big problem in this area, so it is very rare to get water for household usage and for toilet as well" (CL, 36 years, HH number 6, personnel communication)

4.2.2 Non trained mothers

4.2.2.1 Knowledge and attitude of hygiene and sanitation

Most of the participant mothers who are not beneficiaries of GHI health center program reported to have information on how to maintain proper hygiene. Community meetings was the most common source of information reported by respondents (12 out of 15) followed by neighbor's influence (one to one information). Among this group, none has a formal hygiene education. The level of knowledge about how to keep personal hygiene and household hygiene was low among respondents; only 4 out of 15 and 6 out of 15, respectively, knew the importance of disposing children's faeces in the toilet and to keep the cooking materials cleaned. Most respondents 14 out of 15 knew the importance of washing hands with soap before feeding a child or preparing food. Regarding the knowledge about washing hands with soap after using toilet and to keep water and soap for washing them at the toilet only 7 out of 15 visited households claimed to know about it. The 9 households out 15 knows how to keep mothers and children's clothes clean. All 15 respondents identified the importance of cleaning toilets.

4.2.2. Practice of hygiene and sanitation

Among all the interviewed mothers there is a gap between knowledge and practice. The percentage of what the mothers know related on their personal and children hygiene is high compared to what they practice. According to data collected only 3 out of 15 respondents wash their hands with soap before feeding a child or preparing food, while 7 households of mothers who knows the importance of keeping water and soap for washing hands at the toilet none of them is doing that. The activities like keeping the mothers and the children's clothes clean 9 out of 15 knew that, but claimed to wear the clean clothes only if they are going to Health Centers or somewhere else. While all the respondents knew the importance of cleaning the toilet, 4 out of 15 reported to know where the children's faeces should be disposed but only 2 reported to do that.

"I find it stressful to keep on washing your hands every time when your feeding your baby, changing him or after using toilet" (VL, 32 years, HH number 7, personnel communication)

Description	Trained mothers	Non-trained mothers
Source of information on hygiene and sanitation	GHI health center program	Health community meetings

	Health community meetings	One to one information
	One to one information	-

Figure 6:source of information on hygiene and sanitation

Source: Author, 2018

4.2.3 Observation of hygiene practices

During the interviews, I have observed defecation in 13 of the households. In some of the cases, children defecated on a piece of plant leaf placed on the floor by the mother. Most of the children's was not cleaned after defecation and those who were cleaned their mothers did not wash the hand immediately after cleaning a child's bottom, but continued with what they were doing.

Figure 7:Researcher observing toilets facilities



Source: Author, 2018

4.3 Breastfeeding

In this part, the researcher reports on collected data about breastfeeding. The sub question was ***“what are the effects of nutrition training on breastfeeding of children between 0-2 years old?”***

To be able to answer this sub question, 30 participants were interviewed: 15 mothers trained on nutrition education and 15 non-trained. The women were asked questions related to breastfeeding. The variables of interest for breastfeeding were: breastfeeding initiation, how soon as the child first put to the breast after birth, how long the child was breastfed, and if the child was not breastfed, at what age the child was taken off the breast, and what were the reasons for stopping breastfeeding.

Table 2: Breastfeeding knowledge

Description	Trained mothers	Non-trained mothers
Breastfeeding initiation	15 out of 15	15 out of 15

Exclusive breastfeeding	12 out of 15	10 out of 15
Continued breastfeeding	8 out of 15	6 out of 15
Source of information	GHI health center program	Family influence (mother to daughters, mother in law)
	Family influence (mother to daughters, mother in law)	Local women discussion group (akagoroba k'ababyeyi)
	Local women discussion group (akagoroba k'ababyeyi)	Local health center (antenatal care program)
	Local health center (antenatal care program)	-

4.3.1 Trained mothers

4.3.1 .1 Knowledge and source of information

All trained participants reported to have trained about breastfeeding their babies. The GHI health center program was the most common source of information reported by respondents, followed by information sharing through mothers to daughters, the mother in laws, and from the antenatal care program offered by the local health center which is not a part of GHI because program is offered to all pregnant mothers in the community quaternary.

4.3.1 .2 Breastfeeding practice

All the respondents shared that their children were initiated to breastfeeding immediately after birth. And most of them stated that the exclusive breastfeeding is very a common in this community. Although a lesser number of the respondents admitted to drop out before a child turns 6 months old. 3 out of 15 mothers who were trained on nutrition education admitted to stop breastfeeding their child before at the age of 6 months, and 2 of them said that it was because of illness that made them to stop breastfeeding while other mother stopped because of her work.

“After delivery I breastfeed for two months, and then I started feeding him mashed potatoes. My children are always born with heavy weight- breast milk only is not enough for them. However, I got sick and I finally ended up stopping breastfeeding him at five months because he was already used to food” (MA, 43 years, HH number 2, personnel communication)

4.3.2 Non-trained mothers

4.3.2.1 Knowledge and source of information

For the mothers who were not the part of GHI health center program reported to have some basic knowledge on breastfeeding from their mothers, mothers in law, local women discussion group (akagoroba k'ababyeyi) and also from antenatal care program offered by the local health center.

All mothers interviewed in this study had initiated breastfeeding and identified reasons for doing so. The children feeding culture of the mother's family, women discussion group (akagoroba k'ababyeyi), antenatal care program offered by the local health center in the village were counted as the important factors influencing exclusive breastfeeding. This was clearly mentioned by some respondents who explained that "she breastfed her baby the same as her mother breastfed her" (GR, 20 years, HH number 4, personnel communication).

4.3.2.2 Breastfeeding practice

All non-trained mothers reported to initiated breastfeeding immediately after birth. Regarding exclusive breastfeeding 5 out of 15 non-trained mothers reported to stop breastfeeding because of early unpredicted pregnancy. The non-trained mothers believed that when the baby is crying means that is always hungry and they have to breastfeed him/her which is very different from the point of view of trained mothers. However, there is a gap between knowledge and practice on the aspect of continued breastfeeding because both trained and non-trained mothers had less number of mothers who continued to breastfeed their babies. 8 out 15 trained mothers claimed to continued breastfeed their children till 1 year while only 6 non-trained mothers did so as it is showed in above table. They have mentioned poverty and hunger to be the barrier to exclusive and continued breastfeeding.

I always wanted to breastfeed my baby till he reaches 2 years old but I could not even breastfeed him at least one year. I was not generating enough milk to breastfeed him because I did not have enough food to eat. (KA, 25 years, HH number 9, personnel communication).

Figure 8: interview with respondents



Source: Author, 2018

However, non-trained mothers are vulnerable to access of valid information on breastfeeding and do not have trust in the knowledge acquired. For example, they ask advices intentionally from those who were

trained, mothers-in-law or mothers who are experienced but the trained mothers are very confident in breastfeeding practice and others issues related on the training they got.

“Everyone was trying to help me and give me advice about breastfeeding and how to care for my child since this is my first born.” (MK, 19 years, HH number 1, personnel communication).

“My mother and the community health workers encouraged me to breastfeed my child and not to give her anything else besides breast milk before she turns 6 months old”. (DU, 25 years, HH number 8, personnel communication).

4.3.3 Group discussions

Findings from the group discussions revealed the level of knowledge that mothers have with regards to breastfeeding initiation, exclusive breastfeeding, and continued breastfeeding. The key points they pointed out as important were: to breastfeed immediately after delivery, and to breastfeed exclusively for 6 months. In addition, some important traditional beliefs about what lactating women should or not eat whilst breastfeeding were pointed out. Majority of the women reported porridge and cassava leaves (isombe) as the important diet that every lactating woman should eat because they generate more milk while some of the women were arguing that drinking beer especially Primus makes a lactating women generate more milk too.

“What I know is that the child is breastfed as soon as he is born at least till 6 months old. Those saying that the mother has to drink a primus beer to produce more breast milk is false. What we discovered is that if she drinks a well prepared porridge the breast milk will come.” (GD)

4.4 Feeding practice

For this part, the researcher collected data about feeding practices. The sub question was ***“What are the effects of nutrition training to complementary feeding practices?”***

To be able to answer this sub question the mothers were asked questions related to knowledge of when the children should be introduced to solid, semi-solid, soft food and the type of food the infants should be introduced on.

4.4.1 Trained mothers

4.4.1.1 Introduction of solid, semi-solid and soft foods

Knowledge of when the children should be introduced to solid, semi-solid and soft food is very high. The knowledge they claim to gain from GHI health center program include timely introduction of solid, semi-solid and soft food, type of food and at which age should be introduced to infant and the cooking skills. About 15 out of 15 respondents indicated that the children should be introduced to solid and fluids at 6 months and older. In practice, all the respondents planned to introduce solids foods to their babies at 0 to 1 year. When asked about the type of food the infants should be introduced, boiled green banana were the most planned solid food for the infants at 0 to 1 month, followed by the soy porridge and rice mixed with banana. 3 out of 15 trained mothers told the researcher that they introduced soy porridge before 6 months while boiled banana and rice were the most frequently introduced solid foods to infants at less than 1 year and this has been reported by 12 out of 15 trained mothers. At this point of early introduction of food on the side trained of mothers, illness of the mother was the main reason given for early introduction of solid foods, and work. Regarding the source of information on when to start feeding the

children, all the respondents reported the GHI health center program to be the main source of information of feeding practice, followed by the health practitioners (health center nutritionist), family members (mother to daughter, mothers in-law) and from the evening women group discussion.



Figure 9 Household visit during interview

“I introduced soft foods before my child get 6 months old, because I was on shortage of breast milk and I couldn’t let my child die of hunger. So I decided to feed him with the selected foods that we learnt a child must eat like fruits, milk, and porridge” (CL, 28 years, HH number 11, personnel communication).

“My child started eating at her 5 months old, because of her brothers and sisters who usually took care of her when I am not around.” (UW, 42 years, HH number 5, personnel communication).

“Good feeding is good for child illness protection. I always make sure that I feed my child with different variety of foods and get satisfied.” (AL, 37 years, HH number 10, personnel communication).

During my observation, the children were mostly fed by the mother. Only 3 out of 15 households visited, other young females fed the child. The children were mostly fed with a meal served with hands. At least 9 out of 15 trained mothers that fed a child, washed their hands immediately before feeding the child. They were mostly fed on milk, porridge, irish potatoes, spinach, carrots, beans and rice while the researcher was at the household.

4.4.1.2 Meal frequency

For breastfed children, minimum meal frequency includes solid or semi-solid foods at least twice per day for infants aged 6 to 8 months and at least three times per day for children aged 9 to 23 months. For non-breastfed children aged 6 to 23 months, minimum meal frequency is solid or semi-solid food or milk at least four times per day. These meals must be rich in nutrients, containing carbohydrates, vitamins and proteins, which help the child to grow strong and healthy. All the respondents indicated that they know how much it is important to feed their children three meals a day. When asked how many meals a children aged between 0 to 6 months must receive per day, they all said breast milk. Yet they don't have any schedule for breastfeeding, they still believe that crying is a sign of a baby that he need to breastfed. This failure to indicate the number of meals may be due to the fact that mothers who breastfeed do not count the number they breastfeed their babies. For children aged between 1 to 2 years, only 2 out of 15 of the respondents indicated that they give their children three meals per day. About 8 out of 15 mothers give two meals per day and a further 5 out of 15 give one meal per day. The frequently meal consumed are beans, irish potatoes, and green vegetables (spinach). The majority indicated that, the poverty is among the reason why they do not meet the required meal frequency.

"I am a widow with five children and I cannot afford to provide three meals a day." (DU, 39 years, HH number 3, personnel communication).

"They teach and tell us what to do, but poverty is a big problem it prevents me from implementing what I learnt because at least I need a little money to ensure that my child is fed well." (FR, 26 years, HH number 14, personnel communication).

4.4.2 Non-trained mothers

4.4.2.1 Introduction of solid, semi-solid and soft food

There were no big difference regarding awareness on introduction of solid, semi-solid and soft food between trained and non-trained mothers. All non-trained mothers responded that they are aware of the timely introduction of solid and fluids which is at the age of 6 months onwards. However, there is a lack of knowledge on the proper type of foods that should be introduced for the children under 2-years-old. In practice, only 5 respondents out of 15 stated that they introduced solid foods before 6 months, while 10 introduced them when the child was at 6 months and older but less than 1 year. When asked about the type of food the infants should be introduced, they response were the same as the trained mothers. Boiled green banana, rice, spinach, and soy porridge were the most commonly foods given to children under 23 months old. Unpredicted pregnancy was reported by non-trained mothers as the main reason for early introduction of solid foods. Regarding the source of information on when to start feeding the children, the respondents reported health practitioners (health center nutritionist) to be the main source of information of feeding practice during the antenatal program, followed by the family members (mother to daughter, mothers in-law) and the evening women group discussion.

"I know that at 6 months old a child should be introduced on foods but I don't make it because I got pregnant before my first baby get 5 months old and I stopped breastfeeding." (AG, 25 years, HH number 13, personnel communication)."

Through observation, the children were fed by the mother in all 15 households visited. Like for the other households visited the children were mostly fed with a meal served with hands. For the non-trained mothers only 3 out of 15 trained mothers that fed a child, washed their hands immediately before feeding

the child. They were mostly fed on milk, porridge, irish potatoes, beans and rice while the researcher was at the household.

4.4.2.2 Meal frequency

All the non-trained mothers were not sure about the minimum meal frequency that a child must have per day according to his stage of growth. However, all the 15 respondents responded that three meals a day is enough for children under 2 years old. 6 out of 15 respondents reported to feed their children three meals per day while 7 out of 15 respondents admitted to feed their child twice a day according to food availability. Less number of 2 respondents reported to have only one meal per day. It should be noted that there is no special meal prepared for children under 2 years only because the respondents admitted to share the food on common plate with others kids and the caregivers as well. However, this is not common for trained mothers who reported to prepare and feed their children on their own plate.

It was surprisingly also to find out that, the number of proper meal frequency given to non-trained mothers babies are higher than the number of proper meal frequency given to trained mothers babies, this may not be linked to nutrition education but on the accessibility of the foods in the household. Poverty were mentioned by most of the respondents to be the main reason why they do not meet the required meal frequency.

4.5 Infant dietary diversity

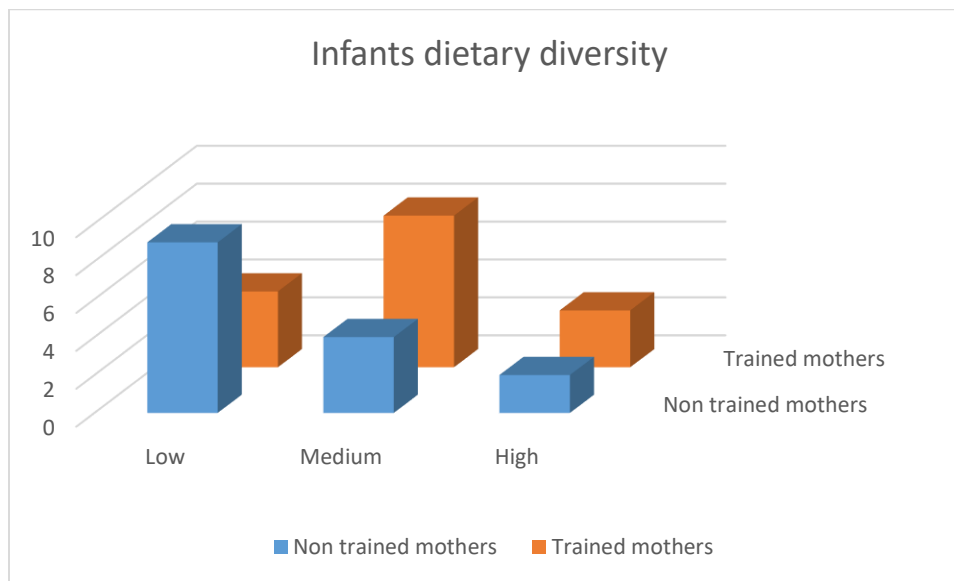
In this part, the researcher collected the data about the contribution of nutrition training to household dietary diversity. The sub-question was ***“what is the contribution of nutrition training to household dietary diversity?”***.

To answer this question each respondent reported the type of foods that the child ate on the day before an interview during the day and at night. The respondent was the person in charge of feeding the baby and for this case all the respondents were the mothers. The purpose of this question was about to calculate the infant dietary diversity score in order to know infant food access, consumption and the quality. However, it has been done on children whom their mother trained on nutrition education and for the mothers who did not receive training on nutrition education.

The following set of 8 food groups were used to calculate the infant dietary diversity score: Cereals, roots and tubers; white potatoes; fruits or vegetables; Meat (red, white); Eggs; Pulse (beans, peas and lentils); milk and milk products; Oil, fat or butter. The data were collected using infant dietary diversity questionnaire, and dietary diversity score were calculated by summing up the different food groups consumed by the child in last 24 hours. The mothers were asked if any food from a specific group among the 8 was consumed by the child on the day before the interview. A point was recorded for the food group consumed and the total of all the points were recorded for each visited household.

The infant dietary diversity score of the interviewed mothers was summarized in three groups; low dietary diversity (1 to 4 food groups consumed), medium dietary diversity (5 to 6 food groups consumed) and high dietary diversity (7 to 8 food groups consumed) (FANTA: Anne et al.,2006).

Infant dietary diversity



Source: Author, 2018

4.5.1 Trained mothers

Consumption of four or more food groups (diet diversity) in this study area have been dominated by GHI health center program beneficiaries where, as the data shows, 4 children found to have low dietary diversity, and 8 children among 15 surveyed had medium dietary diversity while only 3 children had high dietary diversity. The most common food groups consumed are Cereals, roots and tubers, followed by fruits and vegetables; and milk. Animal food products like meats and their products and eggs are almost not consumed in the studied population. Trained mothers reported that the training on nutrition had a positive impact on the lives of their babies and for their households in general. Cooking demonstration and food diversification (four color group) were the most mentioned to have a huge impact in the village.

"The training we received from GHI, helped me a lot in the way of food preparation and I knew how to cook the food with four colors. In addition, I thank the management for really helping us in providing free seeds to plant in our home gardens because I now grow and eat fresh vegetables directly from my garden. Many of these indigenous vegetables are not available in the market and even when available not as fresh as from my gardens" (EM, 40 years, HH number 1, personnel communication)."

For the mothers who had children with low dietary diversity reported the shortage of sufficient food and the number of many people in the household are the reason why they are not feeding their children the appropriate sufficient healthy diet foods.

4.5.2 Non-trained mothers

The consumption of four or more food groups (diet diversity) of the children from the household of non-trained mothers is very low. A total number of 9 out of 15 children of non-trained mothers found to have low dietary diversity, 4 with medium dietary diversity while only 2 children had high dietary diversity. The majority reported to feed their children whatever they also eat. The dominated food groups were cereals, roots and tubers and beans. They expressed the lack of information on importance of food diversification, and the cooking skills as well. For them to feel the stomach full is the most important more than buying

and consuming different types of food group. It was also surprisingly how some of them possess the kitchen garden but none of them is taking care of it (like cultivating different type of vegetables, irrigation and pest control) as it is done by the trained mothers and this was confirmed by the researcher's observation. However, lack of nutrition education on dietary diversity and poverty were the main reason given to cause the low consumption of four or more different food groups. In addition, for the households which meet the required dietary diversity for their infant, they do it accordingly to the food availability not on knowing the importance behind eating diversified foods.

CHAPTER 5. DISCUSSION

5.1 Hygiene and Sanitation

Both trained and non-trained mothers understand the importance of maintaining proper hygiene and the practices that should be done to maintain proper hygiene. Regardless this awareness, there are still low levels of actual practice of these activities. According to RS Newson (2013) this may be due to three main reasons. First, hygiene education may have been insufficient to ensure sufficient levels of knowledge and behavioral change among trained mothers. Second, methods of hygiene education and community mobilization may have been inappropriate for training. Third, there may be a lack of adequate sanitation facilities, the availability of sufficient safe water, and a lack of consistent and correct practices of appropriate hygiene and sanitation. This is supported also by Rwanda Village Concept Project (RVCP) report which stated that only 0.9% people in rural areas have access to clean water and adequate sanitation facilities and women and children spend an average of 30 minutes collecting water, and only a small proportion of toilet comply with safety standards (RVCP, 2013-2014).

5.2 Breastfeeding

From the findings it has been seen that, breastfeeding initiation and exclusive breastfeeding were common practice in the studied sample. According to (Dettwyler 1986; Davies-Adetugbo 1997; Kakute *et al.* 2005), breastfeeding initiation and duration rates are higher in countries within the African continent; and in Rwanda breastfeeding is very common and the exclusive breastfeeding is nearly 90%, which is in line with the WHO recommendations on breastfeeding (RDHS 2014-2015). All the respondents from trained mothers had identified some of the benefit of breastfeeding in particular that breastfeeding gives protection to child from illness. However, none of them identified the benefit related to mother. Most of them agreed that breastfed babies get all the needed nutrients and that breastfeeding reduces the risk of infection. It is also important to highlight that on the side of non-trained mothers, the level of breastfeeding practice after delivery is higher than what is known which is show the impact of women group discussion. This might show that most non-trained mothers practice positive behavior without being aware of their importance. It really indicates that an increase in knowledge should have a positive impact on increasing the practice of the behavior. Although mothers in this study seemed to have knowledge related to breastfeeding from different source, for example their mothers, women group discussion and the health center's anti-natal care program but it was evident that some constraints on exclusive breastfeeding and continued breastfeeding existed including, poverty, hunger, inadequate production of breast milk, unpredicted pregnancy and work. This study confirms the positive role of mother's education to breastfeeding initiation, exclusive breastfeeding and breastfeeding as educating mothers have found as a successful intervention for early initiation and sustaining breastfeeding (Banapurmath C, et al 2013).

5.3 Feeding practices

The findings showed that all the respondents both trained on nutrition education and non-trained are aware of good feeding practices that are responsible for the proper development of children.

According to Hong (2007) the early introduction of complementary feeding may be caused by the living standards of the mothers who are subsistence farmers with little income and are residing in rural areas, where poverty rates are higher and this can result in breast milk shortage for the lactating mothers. In addition, most of the visited households have more than five people living together. It is therefore highly likely that the mothers may not be able to feed their families.

In addition, knowledge of when complementary feeding should be introduced is high among the visited households for trained and non-trained mothers. However, on the side of non-trained mothers, the practice of introducing complementary foods at the age of 6months is higher than their knowledge. This

may be due to the inability of the mothers to keep or continue breastfeeding as the child grows and wants more and more food Stewart, et al., (2013). In addition, child care in Rwandan society has a long tradition of practices for example mothers would start to give their children complementary foods when they reach a known age (6 months) without consciously the importance of the practice (RDHS 2014-2015). Through, the data it can be seen that the gap in feeding practices remain also in the number of meals given to the children per day. Some interviewed mothers responded one meal, others two, while some mentioned three meals a day. As it has been mentioned before the interviewed mothers were from the rural area where their daily regime is to have the first meal in the morning before going to work and sometimes in the afternoon. This is likely to affect children in such households because they attune into this regime and the total number of meals per day would gradually go down (Stewart, et al., 2013). This is confirmed by the findings where some mothers reported what children ate the day before. In addition, many family members may also be a problem of getting enough food for three times a day.

5.4 Infant Dietary Diversity

From the data collected there is a difference between the average of the infant dietary diversity score of the children of trained mothers and the children of non-trained mothers and it is confirmed with Rwanda Demographic and Health Survey (2014-2015) where they reported that the percentage of children consuming four or more food groups is higher with higher levels of mother's nutrition education. This is because of the knowledge of trained mother on food preparation and dietary diversification leading to the diversity in eating behavior. The trained mothers also got the vegetable seeds to plant in their kitchen garden as mentioned by one of the key informant.

"After the training, we make sure each trained mother implement the kitchen garden in her household and we facilitate them by providing vegetable seeds for free so that they can be able to grow vegetables to feed their children and for themselves as well"- key informant

The findings indicated that cereals and fruits and vegetables dominate the diet in 30 households visited in Karwasa village, followed by beans, and milk. The consumption of meat and meat products, eggs and fish were low and this may be due to its high price on the market and the studied population could not afford to buy them which lead to poor nutrition intake for children and this confirmed by Stewart, et al., (2013) in his study done on contextualizing complementary feeding. The cereals and beans are the most food group consumed in visited households. However, animal products especially meat are not frequently consumed. There is also a big difference in vegetables consumption between the households with trained mothers and those who are not. This may be due to the availability of the kitchen garden and free seeds provided vegetable seeds for the households of the trained mothers. Furthermore, it was observed that the feeding knowledge influence the infant dietary diversity in visited households. The reason might be that all visited households have kitchen garden where they grow more than three type of vegetable and the cooking skills they get from the training as it was shown by Susana Akrofi (2012) in her study done on contribution of home garden as a potential strategy for food and nutrition security in Ghanaian rural households.

CHAPTER 6. CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

This study sought to gain insights on contribution of nutrition education on feeding behavior of people in Cyuve sector, Karwasa village. To achieve this objective, 30 mothers with children between 0 to 2 years old were selected to gather information on hygiene and sanitation, breastfeeding, complementary feeding and dietary diversity. This study was commissioned by Garden for Health International (GHI) in order to know if the GHI health center program (nutrition education) implemented through Karwasa health center had a positive impact on feeding behavior of mothers who have children under 2 years of age. To be able to compare half of the selected mothers were the GHI health center program beneficiaries and other half were not. This has been done in order to see if nutrition education have been effective on changing feeding behavior in Karwasa community.

The sub question *“what is the contribution of nutritional education to household hygienic condition?”* is answered based on the findings and analysis of the study. Nutrition education have been found to be effective in terms of knowledge, and attitude towards household hygiene and sanitation, however the practice is still low in the studied community (Karwasa village) for the trained mothers. In addition, it is not only for the trained mothers but also the non-trained mothers who were aware on good hygiene and sanitation their practice is very low. However, it has been shown that even if some of the trained mothers (GHI health center program beneficiaries) do not practice what they know, their knowledge and practice are higher than the ones for mothers who were not trained. This shows that education had positive impact even if the level of practice is still low for the trained mothers living in Karwasa village.

To answer the sub research question *“what are the effects of nutrition training on breastfeeding of children between 0-2 years old?”* the findings and discussion from the study indicate that mothers with formal training were more likely to exclusively breastfeed their babies and for continued breastfeeding. However, even if they are no big difference on breastfeeding initiation practice, exclusive breastfeeding and continued breastfeeding between trained mothers and non-trained mothers, the trained mothers have more knowledge of the practice than non-trained mothers. This should answer the research question as the mothers' education has been a successful intervention for early breastfeeding initiation exclusive breastfeeding and breastfeeding continuation on both knowledge and practice.

To answer the sub research question *“What are the effects of nutrition training to complementary feeding practices?”* the findings and discussion from the study indicate that trained mothers are in advance in knowledge, attitude and the practice of feeding their babies regarding the timely introduction of solids and fluids foods and the type of foods group which should be introduced to children under 2 years old while non trained mothers they only showed little knowledge on feeding practice in which they were not confident about and were not aware of the type of foods that should be introduced to children under 2 years old. Through the findings and the discussion, the research question has been answered by showing that the training on feeding practices influenced feeding behaviour of mothers with children under 2 years old.

To answer the sub research question *“what is the contribution of nutrition training to household dietary diversity?”* based on the study findings and discussions, it is evident that nutrition education contributed on dietary diversity. the difference between trained and non-trained mothers have been identified on growing vegetables, cooking skills and eating behaviour according to the respondents interviewed and the researcher's observation. The trained mothers also indicated that eating diversified food has become their habit. Having a kitchen garden and growing different type of vegetables, plus their learned cooking skills has made their children and the households eating healthy.

Furthermore, in order to answer the main research question “how is nutrition education affecting people’s behaviours on feeding practices in Musanze district, Cyuve sector?” the findings and discussion from the study so far indicate that the nutrition education can positively affect peoples’ behaviour in long run process, and it really need the follow up of the trained people and the availability of necessary basic needs for them in order to achieve the total positive behaviour towards feeding practices.

6.2 RECOMMENDATION

Based on the findings, discussion and conclusion of the study, it is recommended to Garden for Health International to:

- ✓ Work with the local leaders to encourage men to share responsibility, including cooking, work the fields, and transporting wood; to allow mothers to have more time to breastfeed their babies.
- ✓ Work with community health workers and local leaders to discourage negative feeding practices that lead to chronic malnutrition in the community.
- ✓ As women group discussion (akagoroba k’ababyeyi has been shown a big impact on increasing the knowledge in the community it can be recommended to build a system of house to house visit and nutrition counselling, discussion program and its follow up. In addition to that, women empowerment in nutrition would be an added advantage.
- ✓ Find a way to reach mothers early by starting by antenatal care, followed by postnatal care program, to ensure that they know how to care for and for feed their babies and for themselves appropriately.
- ✓ As it was described in training details that some of the training use theoretical method, poster, and visual items it should be better to develop participatory nutrition training program with more practical session more than theories.
- ✓ Conduct a formative research for nutrition education before any nutrition intervention because it could be easier to know what mother prefer to feed babies, the food available in the community, and the full description of their feeding behaviour rather than concentrating on socio-affective factors that lead to baby food choices, how they are served, who in the family is involved in decisions about food or the feeding process.
- ✓ Involve local people in participation of analysis of the project regarding their own situation. In this process of dialogue, they can learn from each other and, indeed, they can produce knowledge which can lead to changing their behaviour in feeding practice.

It is recommended to Ministry of Health and Local Government

- ✓ To increase and improve the existing hygiene and sanitation facilities in rural areas,

- ✓ To work very closely with GHI and invest in increasing the number of mothers attending the nutrition education in the village
- ✓ To strengthen nutrition home garden and make it available to every household in the village
- ✓ To involve community leaders and health to pass along messages on child care, in addition to existing community forums where child care issues are discussed.

It is recommended that further study be undertaken on the following area:

- ✓ The analysis of socio-economic factors that determine chronic malnutrition in rural areas

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APPENDIX

ANNEX 1

PERSONAL REFLECTION ON FIELD RESEARCH

Before leaving the Netherlands to Rwanda, I had a meeting with my supervisor to go over my plans for the field work. Interview, focus group discussion (FGD) and observation were the tools selected that I would be using to collect information while on the field. I had communicated also with my commissioner informing him my plans and my arrival date. I arrived in Kigali on 21st of June 2018. After one day I booked an appointment with my commissioner and three days later I met him for further research discussion. However, I had to seek for permission from the representative of Ministry of Health on district level. I contacted him and it took a couple of days to get the permission and the officials were very welcoming.

After getting the permission from the district health officer I travelled to the village where the research was conducted. However, the community entrance was not easy for me as I expected. While I was on the site conducting the first interview I had to be stopped by the local leader, because he was not aware about what was happening in his village. I explained the reason why I was conducting the interview but still he denied. I was not happy by his decision but it helped me to reflect on my flexibility towards community entrance and my communication skills. After realizing that it was not the right moment to explain to him, I decided to come and live in the same village so that I can be taken as one of them not like a stranger from nowhere. Through the same process I ended up gaining the community trust and local leaders also understood purpose of my study. This helped me to not only to gather correct and trusted information in a safe way but also it improved my communication skills and my ability towards problem solving capacity.

While collecting data, the GHI program beneficiaries tried to impress me by showing the right side of what they know and practice; and on the other side of non-trained mothers they thought I was coming to select new mothers to be trained for the next intake. It was also a challenge for me but as I was in good collaboration with the local leader and the health worker they helped me to spread the message that I was a student who is only collecting data that I don't have any other influence on apart from that. However, this helped me in growing up in terms of team working, it showed me how sometimes you can face a challenge or a problem that you can solve alone, and you need to team up with others to help you pass through. In addition, similar incidence applied as well. As a young man, discussing issues related to breastfeeding to the mothers were very challenging and it might have been affected my results too but teaming up with the health worker have had a positive impact on my research as they opened up themselves and became enthusiastic and contributed towards the issues discussed. On the side of my personal development, it toughens me how to manage and approach the community within a gap of age and different sex and this is so helpful to as a development worker.

Moreover, living in that community for the period of 5 weeks was also challenging but also a life teaching experience, it was my first time living for such a period of time in a rural area, I was not used to their life style but I had to adapt and be dynamic in sake of my research outcomes. It improved my networking ability, to adapt in any situation and the experience in working in a rural area as well.

At the end of the information gathering, I shared the preliminary findings with GHI officials and the health manager at district level to validate the findings. This activity also marked the visit of my former undergraduate university which is in the same district of the study area, after I had to come back from Musanze to Kigali. After a few days' home with my family I returned to the Netherlands where I continued working on my research with the guidance of my supervisor to complete the study.

Looking back at the whole process, I realized that the research involved complexities, things that the researcher must be ready to face. In addition, I realized that being flexible allows the study to lead to unknown and surprising results that bring new knowledge to the results of the study. Once again, I realized that opinion about a study area could influence the enthusiasm with which the study could be conducted. But above all, I realized how finishing it is to realize that you have made a difference in situation through your contribution.

My personal expectations of making a contribution on tackling malnutrition related issues were realised through this study. My stay in Karwasa village offered me the opportunity to experience the life in rural area. Through my interaction with the respondents in the village my livelihood understanding has increased, I observed the agriculture in real life; how people live, what they eat, their activities (gender roles) and I believe as a development worker my personal development has increased and the consult with my supervisor has increased my critical thinking greatly. I am convinced that this study I have conducted when finished would contribute to the improvement of GHI health centre program and the information could be used in designing the appropriate intervention on nutrition education. Last but not the least, I would say that the whole experience was an “eye opener”

ANNEX 2

Data collection questionnaire

Characteristics of the mother		
1. What is your (mother) age?		
2. What is your marital status?	1= Married 2= Partners 3= Divorced 4= Widow 5= Never married	
3. Do you know how to read and write?	1= Yes 2= No (skip to Q5)	
4. What is your highest school level	1= Some primary 2= Some secondary 3= Completed secondary 4= Vocational training	
5. <i>Do you have access to information about breastfeeding and complementary feeding?</i>	1=Yes 2=No	
6. <i>If yes where do you get the information?</i>	1=Health center worker 2=GHI 3=Other mothers 4= Village mother's meeting 5= Radio 4=Other:	
Breastfeeding		
<i>The Questions in this unit are asked to mother of the child.</i>		
1. Do you currently breastfeed your baby?	1 = Yes (skip to Q3) 2 = No	
2. How did you stop breastfeeding?	1 = At once 2 = Reducing the number of breastfeeding per day 3 = Only night or day (Any response skip to Q6)	
3. Did you breastfeed your baby in the last 24 hour (day or night)?	1 = Yes 2 = No	
4.1 How many times was your baby breastfed in the last 24 hours	Record number of times	
5. Do you breastfeed your baby on demand, per schedule or does it depend on your availability?	1 = Child's demand 2 = Schedule 3 = Availability	
5. At the moment, does your baby get any drinks other than breast milk?	1 = Yes 2 = No (skip to Q9)	
6. What was the first drink other than breast milk that your baby was ever given to drink?	1 = Plain water 2 = Cow's milk 3 = porridge	

	4 = Fruit juice 5 = Other:	
7. How old was your baby when you gave this drink for the first time?	Record the number of completed months	
8. What was the reason that triggered you to offer your baby (drink mentioned in Q6)?	1 = Insufficient breast milk 2 = Work (unavailability) 3 = Other:	
Complementary feeding		
1. At the moment, does your baby get any semi-solid or solid foods? (if this question was answered in previous interview, skip it now)		
2. What was the first semi-solid or solid food that your baby ate? (if this question was answered in previous interview, skip it now)	Record the names of foods:	
3. How old was your baby when he/she ate semi-solid or solid food for the first time? (if this question was answered in previous interview, skip it now)	Record the months	
4. How many times did your baby eat solid, semi-solid or soft foods other than liquids yesterday during the day and night?	Record number of times	
5. Who does mainly feed your baby?	1= Myself (Mother) 2= Sister/brother 3= His/her Grand mother 4= Relative	
6. Is your baby given food on her/his demand per schedule or does it depend on the mother/caregivers availability?	1=Child's demand 2=Schedule 3=Caregivers availability	
7. Does your baby eat with other children from the common plate or from her/his own plate?	1=Common plate 2=Own plate	
Hygiene		
1. When do you wash the child's hands?	1= Before feeding 2= After defecation 3= When washing the child 4=Other (specify):	
2. When do you (mother) normally wash your hands?	1=Before eating 2=Before feeding the child 3=After using toilet 4=After attending defecated child 5=Other (specify):	
3. How often do other people who feed your baby wash their hands?	1= Always 2= Sometimes 3= Rarely 4= Not applicable 5= Don't know	
Infant Dietary Diversity Score		
Now I would like to ask you the type of foods that you feed your baby yesterday during the day and at night		
Questions	Coding categories	

<i>Any cereal made food, eg. posh, porridge, bread, rice noodles, biscuits, cookies, or any other foods made from millet, sorghum, maize, rice, or wheat?</i>	<i>1= Yes 0= No</i>	
<i>Any white potatoes or OFSP?</i>	<i>1= Yes 0= No</i>	
<i>Any fruits or vegetables?</i>	<i>1= Yes 0= No</i>	
<i>Any beef, pork, lamb, goat, rabbit, chicken, duck, fresh fish, dried fish, shellfish, or indagara (small fish)?</i>	<i>1= Yes 0= No</i>	
<i>Any eggs?</i>	<i>1= Yes 0= No</i>	
<i>Any foods made from normal beans, biofortified beans, peas, soy or lentils or nuts?</i>	<i>1= Yes 0= No</i>	
<i>Any cheese, yoghurt, milk or other milk products?</i>	<i>1= Yes 0= No</i>	
<i>Any foods made with oil, fat, or butter?</i>	<i>1= Yes 0= No</i>	

Focus Group checklist

Breastfeeding

1. How long did you plan to breastfeed your baby?
2. What made you stop breastfeeding your baby?
3. What did you like/dislike about BF?
4. What do you think are some benefits of BF?
5. What do you think are some disadvantages of BF?
6. What was in your mind about BF before you breastfed your baby?
7. What did you know about BF before you gave birth?
8. Did your perception of BF change after you breastfed? If yes, how?
9. What did you not know about BF before being trained that you know now?

Complementary feeding

1. How did you plan to feed your baby?
2. When did you decide to introduce other food beside breast milk to your baby?
3. Which complementary foods were you aware that are suitable for your baby?
4. Where did you hear about them?
5. Do you think complementary feeding make a difference to you?
6. What would you have liked to know before you were trained that you know now?

Hygiene

1. What does hygiene means to you?

2. How do you make sure that your child is well cleaned?
3. How do you make sure that you (mothers) are well cleaned?
4. What are the source of water you are using in household?
5. What are the type of toilet you are using?

Dietary diversity

1. What does eating healthy means to you?
2. How do you know that you your baby is eating well?
3. Infant dietary diversity score

Other

What do you like/dislike about GHI program?

Key informant

1. What are the challenges of the program in this village?
2. Can you describe what would be the reasons of those challenges?
3. What do you think the community is benefiting the most from your program?
4. How would you get people to take advantage of this program?
5. What are the main parts of this program that will make it successful?
6. What are the various stakeholders you work with in reducing stunting?
7. What are the strategies used in awareness creation of feeding practices of infant and children in the community?

Individuals' open question

1. What is the traditional practice used to feed your baby?
2. For how long did you use that?
3. Where did you get that knowledge?
4. How did you get that knowledge?
5. What is your opinion on it related on growth of the baby?
6. What is important on using those traditional feeding practices?
7. What are disadvantages related on traditional feeding practices?
8. Do you have any other feeding practice you use to feed your baby healthy?

ANNEX 3

Respondents profile

Trained mothers						
Household	Age	marital status	Head of the household	Occupation	Family size	Children
1	40	married	Man	Farmer	8	6
2	43	married	Man	Farmer	6	4
3	39	widowed	Women	Farmer	6	5
4	35	married	Man	None	5	3
5	35	widowed	Women	Farmer	6	5
6	36	married	Man	Farmer	5	3
7	29	married	Man	None	5	3
8	37	single	Women	None	4	3
9	23	widowed	Women	Farmer	3	2
10	37	married	Man	Farmer	6	4
11	28	married	Man	Farmer	5	3
12	30	widowed	Women	None	5	4
13	32	single	Women	None		3
14	26	married	Man	None	4	2
15	34	single	Women	Farmer	5	4

Source: Author, 2018

No-trained mothers						
Household	Age	marital status	Head of the household	Occupation	Family size	Children
1	19	single	women	none	2	1
2	40	married	Man	Farmer	5	3
3	38	married	man	Farmer	6	4
4	20	single	women	Farmer	2	1
5	30	widowed	Women	none	3	2
6	35	married	Man	Farmer	5	3
7	32	widowed	women	Farmer	4	3
8	35	married	man	Farmer	5	3
9	25	married	Man	Farmer	3	2
10	32	single	women	none	4	3
11	30	married	Man	Farmer	5	3
12	28	married	man	Farmer	6	4
13	31	married	man	none		2
14	22	married	Man	Farmer	4	2
15	36	married	man	Farmer	5	3

Source: Author, 2018