**CAPSTONE PRACTICUM REPORT**

# Factors Associated with Minimum Meal Frequency among children aged 6 and 23 months in Western Province in Rwanda

**A secondary data analysis of Rwanda Demographic and Health Survey (RDHS) 2014/2015**

By

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## DECLARATION

I, Lauriane NYIRANEZA, hereby declare that the practicum capstone thesis has been written by me without any external unauthorized help, that it has been neither presented to any institution for evaluation nor previously published in its entirety or in parts. Any parts, words, or ideas in the thesis, however limited, that are quoted from or based on other sources, have been acknowledged as such without exception.

Signature: _____ Date: 16th /April /2018

## DEDICATION

This work is dedicated to my husband HABYARIMANA Gilbert, my sons GANZA Aubert Kim, KUZO Hubert Bruno, SHIMWA Herbert Brian, all children of aged between 6 and 23 months.

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I express my acknowledgment to our almighty God who gave the chance to be part of UGHE student, good health, guidance that helps me to accomplish this course.

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**LIST OF SYMBOLS AND ACRONYMS**

CI: Confidence Interval

GF: Global Fund

IYCF: Infant and Young Child feeding Nutrition

MMF: Minimum Meal Frequency

MMD: Minimum Dietary Diversity

MOH: Ministry of Health

NISR: National Institute Of statistic Of Rwanda

OR: Odd Ratio

PIH: Partners in Health

RDHS: Rwanda Demographic Health Survey

SDC: Suisse Development Cooperation

UGHE: University of Global Health Equity

UN: United National

UNICEF: United Nations International Children's Emergency Fund

USAID: United Stated Agency for International Development

WB: World Bank

**ABSTRACT**

**Background:** Appropriate Infant and Young Child Feeding (ICYF) practices among children aged 6 to 23 month contribute to preventing not only malnutrition but also to reducing mortality and morbidity rate in under five children due to infectious diseases as consequence of poor nutrition. Minimum Meal frequency is one of the key indicators of IYCF. Uptake of Minimum Meal Frequency is low in the Western Province of Rwanda and the factors associated are not known.

**Objective**: The main purpose of this thesis project was to assess the factors associated with Minimum Meal Frequency in Western Province and propose recommendation(s) to inform decision and policy makers on policy reformulation aimed at improving appropriate MMF among children aged 6 to 23 month in Western Province.

**Methods**: The study was a secondary data analysis of data from Demographic Health Survey (DHS) 2014-2015. The outcome variable was Minimum Meal Frequency (MMF). A total of 606 children of age between 6 to 23 month were included in the analysis. Bivariate and multivariate analyses were used to assess the factors associated with MMF.

**RESULTS**

**Result:** Appropriate Minimum Meal frequency among children between the ages of 6 and 23 months was found to be low (37.6%) among children between ages of 6 to 23 month in Western Province in Rwanda. Children from richest families were more like to receive the appropriate MMF (OR: 2.47, 95% CI, 1.19-5.80), children whose mother's educated were more likely to receive the appropriate MMF, (OR: 4.07, 95%CI, 0.83-19.9), Children whose fathers were educated were more likely to receive the appropriate MMF, (OR: 6.6,95% CI, 0.50-9.68), children who were currently breastfed were more likely to receive appropriate MMF (3.29, 95% CI, 1.11-9.72) and child who mother attended the ANC visits were more likely to receive appropriate MMF (9.29 95% CI, 1.04-82.75) were associated with appropriate Minimum meal Frequency in Western Province.

**Conclusion:** Interventions targeting the poor families for improving their economic status, promoting the education for both men and women, strengthening the interventions to increase ANC visits may help to improve the uptake of appropriate MMF in Western Province.

**Key words:** Minimum Meal frequency, Malnutrition, Infant and Young Child Feeding.

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# CHAPTER ONE: INTRODUCTION

## 1.1. Background

Malnutrition is a public health issue globally. Particular, in Rwanda the stunting, which is chronic malnutrition is at 38% among children under 5 years. It is a major cause of morbidity and mortality among children between the ages of 6 to 23 months (International Food Policy Research Institute, 2016; Mekonnen et al, 2017). Globally, more than half of all under-5 child mortality is linked to malnutrition (WHO, 2009). In addition to that, malnutrition negatively affects growth and cognitive development, as well as increases the risk of infectious and chronic diseases (Sinhababu et al, 2010). Malnutrition can be caused by nutrient deficiency, illness, and infectious disease among infants and young children, specifically in low and middle income countries where social economic status of the household are generally lower (Sinhababu et al., 2010; Shahnaz et al., 2014; Rasheed et al., 2017).

Appropriate Infant and Young Child Feeding (IYCF) practices can help prevent malnutrition, and reduce the associated mortality and morbidity (Kassa, Meshesha, Haji, & Ebrahim, 2016). WHO has established a set of indicators for appropriate IYCF practices including timely introduction of soft, solid or semi-solid foods, Minimum Dietary Diversity, Minimum Meal Frequency, and Minimum Acceptable Diet (WHO, 2010).

An analysis in 2012 in 14 low-income countries in Africa and Asia showed that only 11% of children between the age of 6 and 11 months and 25.1% between 8 and 23 months had fulfilled the Minimum Dietary Diversity requirement. Only 7.7% of children aged between 6 and 11 months and 16.3% of children aged between 8 and 23 months were meeting the Minimum Acceptable Diet and Minimum Meal Frequency (Marriott et al., 2012).

In Rwanda, according to DHS 2014-2015, the appropriate IYCF practices vary across different provinces of the country. The national average of appropriate IYCF practices was estimated to be around 18% meaning that the children 6-23 months of ages were feeding according to the appropriate MMF, with the Western Province having the lowest practice rate, averaging at 11% (NISR, MOH and ICF International , 2015).

The uptake of Minimum Meal Frequency in the same period was 44.2% nationally. In the Western province the uptake of Minimum Meal Frequency decreased from 41.1% in 2010 to 37.6% in 2015 (NISR, MOH and ICF International , 2015).

Accordingly, a task force including the Ministry of Health, Ministry of Agriculture and Animal Resources, Ministry of Education, Ministry of Gender and Promotion of Family, Ministry of Local Government, and various development partners was formed in 2014 to implement an interventions package in order to improve the uptake of IYCF practices (Ministry of Local Government & Ministry of Health & Ministry of Agriculture and Animal Resources, 2014).

In order to design a cost effective and evidence-based intervention to improve the uptake of Minimum Meal frequency, understanding the associated factors is essential. To date, there were no other studies that assessed the factors associated with the Minimum Meal Frequency (MMF) in Rwanda especially in Western province.

Accordingly, this project was designed to identify the factors associated with Minimum Meal Frequency in the Western province by conducting secondary data analysis of the DHS 2014-2015. Findings will help to guide policy and decision makers and development partner's to make appropriate recommendations to address the issue.

### 1.2. Problem statement and magnitude

#### 1.2.1. Problem statement

The uptake of the appropriate Minimum Meal frequency among children of age 6-23 months in Western province, in Rwanda is low (37.6%).

#### 1.2.2. Magnitude

The RDHS 2014-2015 showed that the uptake of Minimum Meal Frequency in the Western province was 37.6%, compared to the national average of 47.2% (NISR, MOH, ICF International , 2015).

### 1.3. Objective of the study

**The objectives of the study were to:**

Identify the factors associated with uptake of "Minimum Meal Frequency" among children of age between 6 to 23 months in the Western province by March 2018.

Formulate recommendations based on the factors identified and design the appropriate interventions or policies that could improve the uptake of appropriate Minimum Meal Frequency in the Western province by May 2018.

Increase the uptake of appropriate Minimum Meal Frequency among children of age between 6 and 23 months of age from 37.6% to 50% by April 2020 in the Western province of Rwanda.

### 1.4. Importance of the study

The project analyzed the DHS 2014-2015 data of Western Province.

Western province is one of the five provinces of Rwanda with a high rate of stunting and a low level of Minimum Meal Frequency compared with the nationwide estimate. The proportion of Minimum Meal Frequency decreased from 2010 to 2015 from 41.1% to 37.6% respectively.

The results of this project can provide policy and decision makers the needed information and evidence for them to reformulate related policies. The development partners can also use the results in designing interventions to improve Minimum Meal Frequency uptake and prevent stunting.

The results of the analysis can also provide researchers and academia as basis for further studies and investigations.

Any interventions as results of this study or recommendation can benefit children and families in improving nutritional status, reducing risk of illness, and potential in improving their economic and livelihood status.

### 1.5. Organization of report

This report has six chapters.

Chapter one covers the background of malnutrition and Minimum Meal Frequency. It describes how the problem was identified, significance and justification of the study. In additional, it includes the problem statement, objectives, and beneficiaries of the study.

Chapter two reviewed and analyzed the literature on malnutrition and appropriate IYCF practices including Minimum Meal Frequency. The impact and contributing factors of appropriate IYCF practices worldwide and in Rwanda were also described.

Chapter three describes the methods used in this study including the study setting, study design, sample, measures, data collection tools and procedures, data analysis procedures, ethical considerations.

Chapter four presents the results of the study. Frequencies, percentage, Chi Square and Odd ratio were used in this study. The tables were used to display the results.

Chapter five interprets and discusses the results, implications, project limitations and challenges faced during this project.

Chapter six summarizes the projects and provides recommendations based on the evidences from the analysis.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1. Malnutrition globally

Malnutrition is a main cause of morbidity and mortality in infants and children less than five years of age (Khan et al., 2017). Poor diet and severe and repeated infections are main causes of malnutrition and are closely associated with social and economic conditions, household food insecurity, poor housing quality and lack of access to health care services (UNICEF, WHO, 2015). Many countries in Africa are largely affected by these social and economic factors; with 90% of malnutrition worldwide happened in Africa and 45% of all deaths in under-five children in Africa were caused by malnutrition (Kavosi, et al., 2014).

Malnutrition is defined as a "abnormal physiological, condition caused by deficiencies, excesses, or imbalances in energy and/ or nutrients necessary for an active health life" it is including "under nutrition, over nutrition and micronutrient deficient" (Child & Estimates, 2017).

### 2.2. Consequences of malnutrition

Malnutrition is among key public health issues for children under 5 years of age, as it impacts children's intellectual development and cognitive function (UNICEF, WHO, 2015).

Most of the consequences of malnutrition happen from conception to two years of age (WHO, 2007). Many literature have found that stunting can severely affect brain development and the cognitive system in children; affecting their learning ability as well as causing loss of schooling (The World Bank, 2006; UNICEF, WHO, 2015). Findings from different studies show that children stunted and underweight had lower performance in

language and mathematics than children who are normal (Dorcas.S. 2007; Sri Gajapathy et al ., 2013).

Malnutrition delays individuals' ability to participate in productive activities and contributes to poverty (UNICEF, WHO, 2015). Individuals with malnutrition have weaker immunity and are more prone to having diseases; thus, having higher financial burden associated with health care. Malnutrition-related mortality and morbidity also cause the loss of productivity and human capital for the individual, family and the society (The World Bank, 2006; UNICEF, WHO, 2015).

### 2.3. Infant and Young Child feeding practices

Properly feeding infants and young children is key to the prevention of malnutrition. Many studies have showed that inappropriate infant feeding practice contribute to malnutrition, which can ultimately lead to illness, delayed growth, stunting, nutrient deficiencies and death, especially in first two years of life (Kavosi et al., 2014; Banapurmath et al., 2013). About 54% of 10.9 million deaths caused by malnutrition in under five children in developing countries were resulted from poor feeding practices in the first year of life (Njai et al., 2013).

The WHO recommended Infant and Young Child Feeding (IYCF) practices include the indicators: timely introduction of complementary feeding (feeding the children the solid or semi-solid food) from 6 months of age, Minimum Dietary Diversity (MDD), Minimum Meal Frequency (MMF) (WHO, 2010).

*The WHO defines the* ***Minimum dietary diversity (MDD)*** indicator as "the proportion of children 6-23 months of age who receive foods from 4 or more food groups from a total of 7

food groups, namely, dairy products, legumes and nuts, flesh foods, eggs, vitamin A rich fruits and vegetables, cereals and tubers, and other fruits and vegetables" (WHO, 2010).

***Minimum meal frequency (MMF)*** indicator is defining as "the proportion of breastfed and non-breastfed children aged 6-23 months who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more" (WHO, 2010).

***While the Minimum acceptable diet (MAD)*** indicator is defining as "the proportion of children aged 6-23 months who receive at least the MDD as well as at least the MMF according to the definitions mentioned above(WHO, 2010).

IYCF practices directly influence the nutritional status of under-five children and impact child survival (Horton, 2008)(Bentley et al.,2015). The sufficient quantity and frequency of complementary feeding has an effect on growth and development of child in the first two years (Kathryn at al., 2001). One study conducted in Ethiopia had shown proper MDD and MMF can prevent the under 5 year mortality by 6% (Aemro, Mesele, Birhanu, & Atenafu, 2013a).

Another study also showed that deaths in children under five could be reduced by 13% with optimal breastfeeding and by 6% by introducing appropriate complementary feeding (Jones et al., 2003).

Despite the importance of appropriate IYCF practice, the recommended MMF is not always followed. Studies conducted in Pakistan, Nepal and Ethiopia showed that full time housewives; government employees; women with low education, poor wealth index, or lower

exposure to medial; and women not attending ANC visits were less likely to adhere to MMF (Disha et al., 2015; Khan et al., 2017; Kassa et al., 2016).

## 2.4. Malnutrition and Minimum Meal Frequency in Rwanda

In Rwanda, malnutrition remains a huge public health problem. The result from Rwanda Demographic Health Survey 2014-2015 showed that 38% of children were stunted, 9% of children were wasted while 2% of children were underweight. The rate of stunting has decreased from 45% in 2010 to 38% in 2015, but the prevalence remains high (NISR, MOH, ICF International, 2015). The Western province has the highest rate of malnutrition compared with 44% nationwide, 23% in Kigali city, 40% in the North, 35% in the East, and 41% in the South (NISR, MOH, ICF International, 2015).

The MMF in the Western province is also the lowest, at 37.6% compared to 47.2% nation wide (NISR, MOH, ICF International, 2015).

While many similar studies have been conducted on describing the factors associated with MMF, no such study was conducted in the Western Province of Rwanda.

This project aimed to fill the knowledge gap by assessing the factors associated with the low level of uptake of MMF in Western province of Rwanda.

## CHAPTER THREE: METHODS

### 3.1. Setting of the project

The project analyzed the secondary data of the Rwanda Demographic and Health Survey (RDHS) 2014-2015 and described the factors associated with the low uptake of MMF in the Western Province of Rwanda. The Western province is one of the five provinces in Rwanda with 5,883 square kilometers and has a population of 2,471,239 with 168,445 male and 1,302,794 female and a population density of 420 persons per $km^{2.}$ (NISR, 2012); 27.4% of population from Western Province is living in extreme poverty (NISR, MOH, ICF International , 2015).

About 45% of children less than 5 years in Western province had stunting (44%), higher than the national average of 38%; while the IYCF practices is at 37.6%, lower than the 44.2% of national average (NISR, MOH, and ICF International, 2015).

### 3.2. Design

The study was cross sectional, a secondary data analysis of RDHS 2014-2015, focusing on children between the ages of 6 to 23 month living in the Western province of Rwanda.

**Description of Rwanda Demography Health Survey**

The RDHS is a survey performed every five-years by the National Institute of Statistics of Rwanda (NISR) over a period of six months from November through April of the following year and jointly funded by the Government of Rwanda, United States Agency for International Development (USAID), One United Nations (One UN), Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), World Vision International, Swiss Agency

for Development and Cooperation (SDC), and Partners in Health (PIH) (NISR, MOH, ICF International, 2015).

### 3.3. Sample

All data for children between the ages of 6 to 23 month in the DHS 2014-2015 meeting the inclusion criteria (detailed below) were included in the study.

**Inclusion criteria**

The following criteria were used to identify the samples to be included in the analysis:

- Children aged between 6 and 23 months
- Being a resident of the Western Province during DHS data collection

### 3.4. Measures

#### 3.4.1. Dependent variables

The dependent variable were MMF; it is the minimum number of time of solid, semi-solid and soft food given to the children between the ages of 6 to 23 months in the past 24 hours in the RDHS. The variable was coded as dichotomous (yes/no) according to whether families reported that children were receiving the appropriate Minimum Meal Frequency, as determined by the categories in tables below.

**Table 1: Dependent variables**

| Variables | Meal Frequency |
|---|---|
| Children breastfed 6-8 month | Receiving solid and semisolid food at least two times per day |
| Children breastfed 9-23 month | Receiving solid and semisolid at least three times per day |
| No breastfed children 6-23 month | Minimum meal frequency is receiving solid or semisolid food or milk feeds at least four times a day. |

*Source: WHO, 2005*

### 3.4.2. Independent variables

The independent variables were socio demographic and economic characteristics of respondents as described in the table below.

**Table 2: Independent variables**

| Variables | Categories |
|---|---|
| **Household characteristics** | |
| Wealth index | a. Poorest<br>b. Poorer<br>c. Middle<br>d. Richer<br>e. Richest |
| Residence | 1. Urban<br>2. Rural |
| Number of household members | a. Five or less<br>b. More than 5 |
| Number of children 5 year or less in the household | a. One children<br>b. Two or more children |
| Exposure to nutrition education | 1.Yes<br>0.No |
| **Characteristics of women** | |
| Women and husband / partners | a. No education<br>b. Primary<br>c. Secondary and high |
| ANC Visits during previous pregnant | a. None<br>b. 1-3 Visits |

| Variables | Categories |
|---|---|
| | c.4 or more visits |
| Women's current occupation | 1. Yes<br>0. No |
| **Characteristics of children** | |
| Age of children in month | a.6-8 month<br>b.9-11 month<br>c.12-17 month<br>d.18-23 month |
| Breast feeding status | 1. Yes<br>0. No |

*Source: analysis from RDHS 2014-2015*

### 3.5. Data collection tool and procedures

The RDHS 2014-2015 dataset was downloaded from DHS program website after getting the approval from DHS program. The variables of interest were extracted for analysis.

### 3.6. Data analysis procedures

Descriptive statistics were used to present the dependent and independent variables. The bivariate analysis using Chi square tests were conducted to assess the association between all independents variables and MMF, with associations considered statistically significant if the p-value was less than .05. All variables that were significantly associated with MMF were further analyzed using logistic regression. All analyses were done using STATA version 13, Stata Corps 2011 College Station, TX. Results were presented with adjusted odds ratio at 95% confidence. Due to sampling strategy used in the DHS 2014-2015, which can have an impact on the results of the study, all data analysed were weighted to make the sample representative in Western Province.

### 3.7. Ethical considerations

DHS 2014-2015 in Rwanda was conducted after getting approval from the Rwanda National Ethics Committee and the Measure DHS Project. For this project, we submitted the initial proposal to the University of Global Health Equity Institutional Review Board, Academic Ethics Review, clarified the objective and rational of the study and explained that the fact that this was secondary data analysis, human subjects were not involved.

In addition, we have requested the approval of using the DHS data the DHS program. The data analysis was conducted after getting the approval from DHS program and exemption from the University of Global Health Equity Institutional Review Board, Academic Ethics Review.

## CHAPTER FOUR: RESULTS

### 4.1. Results of descriptive analysis

A total of 606 children from 6 to 23 months of age were extracted from the RDHS for analysis. Out of them, 34.8% (n=211) were from the poorest families, 23.2% (141) were from the poorer families, 17.9% (n=109) were from the middle families, 14.2% (n=85) were from the richer families and 9.9% (n=60) were from the richest families, 17.8% (n=108) were living in urban area while 82.2% (n=498) were living in rural area. (Table 3).

The majority (n= 495, 81.7%) of household had more than five household members while 18,3% (n=111) had five or less household members (Table 3). The majority (56.3%, n=341) of the household had more than one child less than 5 years old while 43.7% (n=265) had one child less than 5 years (Table 3).

Most of children's mother (71.3%, n=432), had primary level of education while women with no education were found at 19.3% (n=117) and women with secondary and high level of education were few at 9.4% (n=57). (Table 3)

Most of children's father (71.7%, n=395), had a primary level, who have no education were represented at 17.4% (n=96) while men who had a secondary level of education were represented at 10.3% (n=57) (Table 3).

The children who were breastfed at the time of DHS data collection, was found at 95.9%, n=581) (Table 3).

As per the child's age in months, most of them were aged between 19 to 23 months, which represented 28.8% (n= 172); children from 6-8 month were found at 19.7% (n=119).

Most of the mother of the children had been exposed to nutrition education that was found at 66.1% (n=400) while 33.9% (206) were not (Table 3).

The prevalence of uptake of appropriate Minimum Meal Frequency was found at 37.6% in Western Province in Rwanda.

**Table 3: Description of demographics and MMF**

| **Demographics and MMF** | | **N (%)** |
|---|---|---|
| Sample (N) | | 606 |
| Wealth index | Poorest | 211 (34.8%) |
| | Poorer | 141 (23.2%) |
| | Middle | 109 (17.9%) |
| | Richer | 85 (14.2%) |
| | Richest | 60 (9.9%) |
| Residence | Urban | 108 (17.8%) |
| | Rural | 498 (82.2%) |
| Household size | Less and 5HH members | 111 (18.3%) |
| | More than 5 HH | 495 (81.7%) |
| # Children under 5 year in HH | One child | 265 (43.7%) |
| | Two or more children | 341 (56.3%) |
| Education of women | No education | 117 (19.3%) |
| | Primary | 432 (71.3%) |
| | Secondary and high | 57 (9.4%) |
| Education of Partner /husband | No education | 96 (17.8%) |
| | Primary | 395 (71.7%) |
| | Secondary and high | 60 (10.8%) |
| Currently breast feed of child | Yes | 25 (4.1%) |
| | No | 581 (95.9%) |
| Child 's age (month) | 6-8 | 119 (19.7%) |
| | 9-11 | 115 (19%) |

| Demographics and MMF | | N (%) |
|---|---|---|
| | 12-18 | 200 (33%) |
| | 19-23 | 172 (28.3%) |
| # ANC visits during previous pregnant | None | 7 (1.2%) |
| | 1 – 3 | 323 (53.3%) |
| | 4 or more | 276 (45.5%) |
| Exposed to nutrition education | Yes | 400 (33.9%) |
| | No | 206 (66.1%) |
| Met Minimum Meal frequency | Yes | 228 (37.6%) |
| | No | 378 (62.4%) |

### 4.2. Bivariate analysis

#### 4.2.1. Description of Minimum Meal Frequency by characteristics of respondent

Table 4 below presents the association between receiving Minimum Meal Frequency and selected household characteristics including wealth index, residence, number of children, and number of household members.

The proportion of children born from the richest families who were receiving appropriate Minimum Meal Frequency were high (57.8%, n=35) compared to children in the poorest families (29.2%, n= 62). The wealth index is significantly associated with MMF statistically ($p<0.01$).

The proportion of children who were receiving appropriate Minimum Meal Frequency was found at 41.5 % (n=45) urban while in rural was found at (36.7%, n=183). The difference was not statistically significant (P=0.3)

The proportion of children who were receiving appropriate Minimum Meal Frequency was found at 38.8%, n=192) in the families with more than 5 members while it was found at (32.4%, n=36) in the families with 5 members or less. The difference was statistically significant (P=0.1)

The proportions of children who were receiving Minimum Meal Frequency were found at (39.9%, n= 36) in the families with two or more children under five while it was found at (34.6%, n=91) in the families with one child less than 5 years. The difference was not statically significant (P=0.1).

Women's education was found associated with appropriate minimum Meal Frequency. Children with mother who completed secondary and higher education were highly receiving the appropriate minimum meal frequency (53.2%, n= 33) than those who completed only primary school (38.7%, n=167) and who were not educated (23.3%, n=28), with p<0.01.

The children with father who had completed secondary or higher education (46.3%, n=31) were high in receiving the appropriate minimum Meal frequency compared to those completed primary school (36.2%, n= 143), and not educated (34.3%, n= 33), with P<0.01.

The proportion of children with the mother who had the occupation were high in receiving the appropriate Minimum Meal Frequency (38.7%, n= 203) than those who had no occupation (30.4%, n=25) with P=0.01.

The proportion of children who were breastfeeding at the time of survey who were receiving the appropriate Minimum Meal Frequency was found high (38.8%, n= 223) than who were not breastfeeding (20%, n= 5), with P=0.04.

No statistical significant associations were found between MMF and the residence of

respondents (P=0.3), number of household members (P=0.1), number of children of 5 or less years in the household (P=0.1), the exposure to nutrition education, (P=0.06) and age of children in month (P=0.3).

**Table 4: Bivariate analysis of MMF**

| | | Appropriate MMF | P-Value |
|---|---|---|---|
| | | N (%) | |
| Wealth index of HH | Poorest | 62 (29.2%) | <0.01 |
| | Poorer | 47 (33.3%) | |
| | Middle | 38 (34.8%) | |
| | Richer | 46 (54.2%) | |
| | Richest | 35 (57.8%) | |
| | Total | 228 (37.6%) | |
| Residence | Urban | 45 (41.5%) | 0.3 |
| | Rural | 183 (36.7%) | |
| | Total | 228 (37.6%) | |
| Number of HH member | 5 or less | 36 (32.4%) | 0.1 |
| | Above 5 | 192 (38.8%) | |
| | Total | 228 (37.6%) | |
| Number of children under 5 years | One | 91 (34.6%) | 0.1 |
| | Two or more | 36 (39.9%) | |
| | Total | 228 (37.6%) | |
| Education of women (mother) | No education | 28 (23.3%) | <0.01 |
| | Primary | 167 (38.7%) | |
| | Secondary and high | 33 (53.2%) | |
| | Total | 228 (37.6%) | |
| Education of husband/ partners (father) | No education | 33 (34.3%) | <0.01 |
| | Primary | 143 (36.2%) | |
| | Secondary and high | 31 (46.3%) | |
| | Total (551) | 207 (37.6%) | |

| | | | |
|---|---|---|---|
| Currently working of women | No | 25 (30.4%) | 0.01 |
| | Yes | 203 (38.7%) | |
| | Total | 228 (37.6%) | |
| Exposure to nutrition education | No | 71 (34.4%) | 0.3 |
| | Yes | 157 (39.5%) | |
| | Total | 228 (37.6%) | |
| ANC visits | None | 1 (14.3%) | 0.04 |
| | 1-3 visits | 116 (35.9%) | |
| | 4 or more ANC visits | 111 (40.4%) | |
| | Total | 228 (37.6%) | |
| Child's age in month | 6-8 months | 47 (39.2%) | 0.06 |
| | 9-11 months | 31 (26.1%) | |
| | 12-17 months | 79 (39.5%) | |
| | 18-23 months | 71 (41.2%) | |
| | Total | 228 (37.6%) | |
| Currently breastfeeding | No | 5 (20.0%) | 0.04 |
| | Yes | 223 (38.8) | |
| | Total | 228 (37.6%) | |

**Source: RDHS2014-2015**

### 4.3. Results of Multivariate analysis

Results of the logistic regression showed wealth index ($p<0.01$), education of women and partner ($p<0.01$), ANC visits ($p=0.04$), currently breastfeeding ($P=0.04$) were significantly associated with Minimum Meal Frequency.

The children between the ages of 6 and 23 months from richest families were 2.47 times more likely to receive the appropriate MMF compared to the children from the poorest families (OR: 2.47, 95%CI, 1.9-5.80). The children from richer families are 2.6 times more

likely to receive the appropriate MMF compared to the children from poorest class (OR: 2.6, 95% CI, 1.57-4.34).

Education of women was significantly associated with appropriate MMF (p= 0.01). The children whose mother had secondary and high level of education were 3.9 times more likely to receive the appropriate MMF than who were not educated (OR: 3.9,95% CI, 1.17-5.39).

Education of husband was associated with appropriate MMF (p=0.01). Children whose father had higher education and secondary level were 6.2 times more likely to practice MMF than children with father no educated (OR: 6.62, 95% CI, 0.50-9.68).

Breastfeeding status of children was associated with appropriate MMF (p =0. 03). Children who were breastfed were 3.2 times likely to be fed according to MMF comparable to these who were not (OR: 3.29, 95% CI, 1.11-9.7).

The children whose mother attended the ANC visits during the previous pregnancy were significantly associated with appropriate Minimum meal frequency (p= 0.03). The children whose mother attended 4 ANC visits during previous pregnancy were 9.2 times more likely to practice appropriate MMF compared to these who were never attended ANC during previous pregnancy (OR: 9.29,95% CI, CI 1.04-82.75). Children whose mother attended one to 3 three ANC visits were 7.4 times more likely to practice appropriate MMF than who did not attend ANC visits [OR: 7.42, 95% CI, 0.80-68.3].

Current occupation of women (P=0.06) and age of children in month (P=0.5) were not significantly associated with MMF in multivariate analysis.

**Table 5: Table summarizing the results of multivariate analysis**

| | | AOR | CI 95% | P-value |
|---|---|---|---|---|
| HH Wealth index | Poorest | 1 | | |
| | Poorer | 1.34 | [0.79-2.25] | 0.2 |
| | Middle | 1.28 | [0.70-2.34] | 0.4 |
| | Richer | 2.60 | [1.57-4.34] | 0.01 |
| | Richest | 2.47 | [1.19-5.80] | 0.01** |
| Education of women | No education | 1 | | |
| | Primary | 1.65 | [1.03-2.61] | 0.03 |
| | Secondary& High | 3.90 | [1.17-5.39] | 0.01** |
| Education of husband/ Partner | No education | | | |
| | Primary | 0.73 | [0.26-2.04] | 0.55 |
| | Secondary& higher | 6.62 | [0.50-9.68] | 0.01** |
| Current occupation of women | No | 1 | | |
| | Yes | 1.32 | [0.9-2.9] | 0.06 |
| Currently breastfeeding status | No | 1 | [0.7-2.1] | |
| | Yes | 3.29 | [1.11-9.7] | 0.03* |
| Attendance ANC visits | None | 1 | [0.7-2.1] | |
| | 1-3 ANC | 7.42 | [0.80-68.3] | 0.04 |
| | 4 or more ANC visits | 9.29 | [1.04-82.7] | 0.03* |

** mean p>0.05 : significantly associated with MMF

## CHAPTER FIVE: DISCUSSIONS

Our analysis showed that the percentage of children who met the MMF were at 37.6%, slightly higher than the reported rates in Burkina Faso (31%) and Mali (20%) (Constance et al ., 2015). The higher rate of MMF in our study may be attributed to the difference in socio cultural context between Rwanda, Burkina Faso and Mali. . However, our reported Minimum meal frequency is lower than the national rate of 47.2%. The low prevalence of MMF in Western province compared to national average might be attributed to the social economic status of household where around 27.4% households were reported to live extreme poverty. This might make them unable to affordable the foods (NISR, MOH, ICF International , 2015).

### 5.1 Wealth index of Household

Results further showed that the wealth index was associated with practice of appropriate Minimum Meal Frequency in Western Province. The proportion of MMF was increasing with wealth categories, more practices in the richest, richer families compared to the middle, poor and poorest families. Children born in richest families had the high chance to have appropriate minimum meal frequency than those born in the poorest families. Our result is in agreement with studies conducted in Ethiopia, and Tanzania (Demilew, 2017; Gautam, Adhikari, Khatri, & Devkota, 2016; Khan, et al., 2017; Constance et al., 2105). Rich families have better ability to afford and purchase food, access to information and land, thus less likely to face food insecurity issue compared to the poorest families who cannot afford basic needs like house or food (Feinstein, Sabates, & Anderson, 2006; NISR, Social protection and VUP report 2014). The poverty and lack of resources imply the inability of household to afford the required sufficient food, which in turn leads to the food insecurity in the household. The lack of food directly impacts the appropriate minimum meal frequency

because when there is no sufficient food in the household, the feeding of children with the required number of food per day will be reduced.

### 5.2. Education of women

Mother's education was significantly associated with providing appropriate Minimum Meal Frequency. This is in agreement with other studies conducted in Nepal, Pakistan, Tanzania, Ethiopia (Gautam et al., 2016; Khan, et al., 2017; Constance et al., 2015; Aemro et al., 2013). Educated women have better ability to read and understand messages and information related to nutrition. Educated women are more to be involved in the decision making related to the health of themselves and of their children than uneducated women, including allocating money to purchase food or other basic need for the household (USAID, 2015b).

Other studies have also suggested that educated women are more likely to find employment because of their skills and knowledge (USAID, 2015a), however, our study results did not find employment was associated with MMF practice. Education and poverty are closely associated. Unfortunately, many interventions in nutrition are disseminating the nutrition message through different channels of communication like poster, brochures that are not utilized by the uneducated people. The findings points out the implication in improving the practices of appropriate minimum meal frequency by informing the stakeholders that the nutrition message have to be very easy and understandable even by the less educated people.

### 5.3. Education of husband

Consistent with the findings of other studies, the education of husband or partners in the household was found to be associated with providing appropriate MMF to the children. Educated men were found to be collaborative with their partners and make decisions jointly

on how to use the money or resources in the household (Alderman & Headey, 2017). They also are more likely to be employed and able to purchase the sufficient food for their household, contributing in the wellbeing of their family. As stated by Noelle Kassiime, male involvement in parenting contributes to the wellbeing of the whole family, encouraging positive cognitive, emotional and social behavior of children (Kansiime, Atwine, Nuwamanya, & Bagenda, 1956). Feinstein showed that Education is a significant method for strengthening the health and welfare of individuals, and is associated with wealth index of the family (Feinstein et al,. 2006). This is supported by Alderman, who revealed that the education of parents is linked to the wellbeing of the family, lower mortality rate and preventing malnutrition of children under five years. Furthermore, promoting the education of parent give them more chance of getting the job and enhance their livelihood of the family (Alderman & Headey, 2017). Designing the message and interventions targeting the less educated men and improving the parenting‘s education and will improve the uptake the appropriate minimum Meal Frequency.

### 5.4. Antenatal care visits

Mothers who attended ANC visits were more likely to provide the appropriate MMF to their children than who did not, similar to the findings in Mali, Pakistan (Constance et al,. 2015;Khan, et al,. 2017). During ANC visits pregnant women received the messages related to nutrition, consequently increases their knowledge on appropriate feeding of young children. One study in south Ethiopia on the contrary, showed attending ANC was not associated with appropriate MMF (Kassa et al., 2016). The type of services provided at the ANC in Ethiopia should be investigated to understand the difference. The result might be used in encouraging the women to attend the ANC visits through social mobilization.

As stated by Callixt, the low attendance of ANC visits could be associated with lack of transport fee and co-payment. As showed that in the future, increasing the attendance of ANC visits will improve the practice of appropriate of MMF (Callixt .Y,George.B.S, n.d.).

### 5.5. Current Breastfeeding

Children who were currently breastfed were more likely to be fed at least minimum number of times per day compared to children who were not currently breastfed. Children who are breastfed are probably most of the time closer with their mother and it is easier for mothers to feed them more frequently. Government of Rwanda, development partners might consider to use the results in designing the message emphasizing the importance of breastfeeding, and encourage the lactating women to continue breast feeding up to two or more year. E.g.: avail a room for lactating women at work where they can breastfed their children and continue to educate the parents on importance of breastfeeding and encourage them to continue breastfeeding.

There are some limitations of this study. This study has been conducted in Western province out of 5 provinces countrywide. The results about factors associated with Minimum Meal Frequency among children from 6 to 23 month in Western Province in Rwanda should not be generalized to the rest of the country. They should rather serve as a pilot study to encourage further studies involving other Rwandan provinces. Secondly, the study used secondary data from DHS2014-2015. Much information was not collected regarding many possible determinants of behavior such as food security, social support, social norms, beliefs about self-efficacy, as well as knowledge of family members on nutrition, especially on Minimum Meal Frequency. As the DHS uses a cross sectional design, it is more prone to recall bias. In addition, DHS survey couldn’t establish causes and affect because the factors associated and outcome are measured simultaneously.

# CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

## 6.1. Conclusion

The study aimed at assessing the factors associated with appropriate Minimum Meal frequency in Western Province by analyzing DHS 2014-2015 data.

The study result was found that appropriate Minimum Meal Frequency was low in Western Province of Rwanda and it was significantly associated with wealth index of household, women and husband education, attendance of ANC visits and current breast feeding status of children.

## 6.2. Recommendations

Appropriate Minimum Meal Frequency can help to reduce and eradicate malnutrition among children between 8 to 23 months. Based on the evidence from this study, the findings showed different factors associated with Minimum Meal Frequency, the following recommendations are addressing to the Government of Rwanda and development partners working in nutrition.

### 1. Wealth index

There is an urgent need to design the income generating interventions aimed at improving the social economic status and livelihood of poor household. Introducing income-generating activities through the approach of cooperative where the poor families will be helped to get the loan and make the small project should do this. E.g. Poultry project that requires small loan with potential to generate better economic and nutritional results amongst the poor households.

**2. Education of parents**

There should be the promotion of the men involvement in nutrition related education activities, to ensure they support the women in feeding their children. e.g.: sensitize the men to attend a kitchen village activity where the community members at village level meet and receive the nutrition education and cooking demonstration using the local food available.

The implementing partners should design outreach activities such as interpersonal communication (IPC) activities in nutrition targeting the men at village level, where men have to receive the nutrition education in the small groups. In the session, men should discuss on their roles in preventing malnutrition, share their experiences. Their peers should facilitate the IPC sessions.

The implementing partners should disseminate the very easy and understandable nutrition education message for behavior change using different channel of communication such as: drama, community dialogue though peer educators targeting to the less educated people.

**3. ANC visits**

Reinforcing the existing strategies to increase ANC visits among pregnant women (E.g.: Rapid short message service (SMS), which is innovative technologies where the community health workers use the telephone to report the maternal and child indicators. This help in close follow up of pregnant women regarding attendance ANC visits.

Making more accessible the ANC services by conducting the outreach sessions of ANC in the community with a main purpose of making the services more accessible to the beneficiaries with whom the transport fee can be a barrier to get the services.

**4. Breastfeeding status**

Continue to disseminate the information and message on breast-feeding and its importance for appropriate Infant and young child feeding practices. E.g.: Include the breastfeeding topic in the list of themes of parenting evening at village level. In addition, the promotion of the 1000 days campaigns should be encouraged especially for women of reproductive age.

**5.3. Future initiatives and research**

The study revealed the factors associated with Minimum Meal Frequency, but it needs to be completed by other research to show the roots causes of low uptake of Minimum Meal Frequency: e.g: understanding the barriers to uptake the appropriate the MMF practices among children of ages between 6 to 23 month in Western province.

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## APPENDICES

### 1. DHS authorization

**Please see attached.**

You have been authorized to download "Survey" data from the Demographic and Health Surveys (DHS) Program. To begin downloading, please login at: http://www.dhsprogram.com/data/dataset_admin/login_main.cfm . If you are new to DHS Datasets, and need additional guidance, please watch our videos on:

Downloading Datasets - https://youtu.be/Kzv075WRVZA
Bulk Dataset Download - https://youtu.be/bVfQ_4ZxBAQ

The requested data should only be used by you, and for the purpose of the registered research or study. The data must not be passed on to others, without the written consent of DHS. To use the data for another purpose, a new research project must be "created" in your account. All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey. Users are required to submit a copy of any reports/publications resulting from using the DHS data files to: archive@dhsprogram.com. Please reference the complete terms of use at: https://dhsprogram.com/Data/terms-of-use.cfm .

The files you will download are in zipped format and must be unzipped before analysis. After unzipping, please print the file with the .DOC/DOCX extension (found in the Individual and Male Recode Zips). This file contains useful information on country specific variables and differences in the Standard Recode definition. You will also need the DHS Recode Manual: http://dhsprogram.com/publications/publication-dhsg4-dhs-questionnaires-and-manuals.cfm . This manual contains a general description of the recode data file, including the rationale for recoding; a description of coding standards and recode variables, and a listing of the standard dictionary, with basic information relating to each variable.

It is essential that you consult the questionnaire for the country, when using the data files. Questionnaires are in the appendices of each survey's final report: http://dhsprogram.com/publications/publications-by-type.cfm . We also recommend that you make use of the Data Tools and Manuals at: http://www.dhsprogram.com/accesssurveys/technical_assistance.cfm .

For problems with your user account, please email archive@dhsprogram.com. For data related questions, please register to participate in the DHS Program User Forum at: http://userforum.dhsprogram.com .

The Demographic and Health Surveys (DHS) Program
ICF
530 Gaither Road
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Rockville, MD 20850
USA
LOGIN INFORMATION:
Login Email: nyiralauriane@yahoo.fr
Password: (use password selected when you registered)

**University of Global Health Equity Institutional Review Board**
**Academic Ethics Review**

**Notification of Exemption Determination**

October 12, 2017

**Protocol Title:** Factors associated with Infant and Young Child Feeding practices among children 6-23 month in Western province: A secondary data analysis of Rwanda Demography Health Survey (2014-2015)
**Principal Investigator:** Lauriane Nyiraneza
**Protocol #:** 0040
**Funding Source:** (none)
**IRB Review Date:** October 3, 2017
**IRB Review Action:** Exempt

Lauriane Nyiraneza,

On October 3, 2017, it was determined this submission meets the criteria for exemption per the norms and procedures of the Rwanda National Ethics Committee and regulations of the Department of Health and Human Services of the United States (45 CFR 46.101(b)).

Additional review is not required. However, any changes to the protocol that may alter this determination must be submitted for review via a Request for Modifications to an Existing Protocol, in order to determine whether the research activity continues to meet the criteria for exemption.

The IRB made the following determination:

- This research involves the collection or study of existing data, documents, records, pathological specimens or diagnostic specimens, from sources that are publicly available.

Please contact the UGHE IRB via email at irb@ughe.org with any questions.

Sincerely,

Phaedra Henley, IRB Chair