

**UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE**

**MATERNAL AND CHILD NUTRITION IN CHPS ZONES IN JIRAPA  
MUNICIPALITY, GHANA**

**FRANCIS XAVIER TENGEPARE**

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MUNICIPALITY, GHANA**

**BY**

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**UDS/MPHN/0015/17**

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AWARD OF MASTER OF PHILOSOPHY DEGREE IN PUBLIC HEALTH  
NUTRITION**

**JULY, 2020**



## DECLARATION

### Student

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere:

Candidate's Signature:..... Date:.....

Name: FRANCIS XAVIER TENGEPARE (UDS/MPHN/0015/17)

### Supervisor

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University for Development Studies.

Principal Supervisor's Signature:..... Date:.....

Name: DR. DENNIS CHIRAWURAH (PhD)



### ABSTRACT

The study was conducted in Jirapa Municipality to assess the performance of CHPS zones on maternal and child nutrition indicators. The study was a mixed method descriptive cross-sectional study. The study involved all CHPS compounds in the Jirapa Municipality. Convenience sampling was used to obtain registered mothers for child welfare services at the CHPS compound. Two sets of structured questionnaires were used to collect quantitative data, one set for CHPS compounds and the other set for mothers. In-depth interview guide was used to collect qualitative data. Bivariate tests were used to test statistically significant association between categorical dependent variables and the independent variables. All statistically significant variables from the bivariate tests were put into logistics regression models to determine their effect on maternal and child feeding indicators. The performance of CHPS zones on maternal and child nutrition indicators was determined as composite indicator. CHPS zones performance was the main independent variable while household food consumption score (FCS), minimum dietary diversity (MDD) and minimum acceptable diet (MAD) were the main dependent variables. The result shows that most CHPS zones are inadequately resourced for maternal and child nutrition health care services delivery. The performance of most CHPS zones in maternal and child nutrition health care services delivery is inadequate. Less than a quarter of households in CHPS zones have acceptable household FCS while a little over half of children in CHPS zones have the MAD. The performance of CHPS zones on maternal and child nutrition indicators is associated with household FCS and MAD of children. Household food consumption score, dietary advices from family members and CHPS performance are predictors of MAD score of children in CHPS zones. The health care system in CHPS zones needs to be strengthened with adequate resources, regular training of community health officers (CHOs) on maternal and child nutrition and motivation of CHOs in CHPS zones.



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## DEDICATION

I dedicate this success to the memory of Rev. Bro. John Bosco Bongnea (friend & boss), Micheal Tengepare (father) and Rosalia Bongfodeme (mother). May their souls rest in peace, Amen.



**TABLE OF CONTENTS**

DECLARATION ..... i

ABSTRACT ..... ii

ACKNOWLEDGEMENTS ..... ii

DEDICATION ..... iv

LIST OF TABLES ..... vii

LIST OF FIGURES..... ix

ABBREVIATIONS..... x

CHAPTER ONE ..... 1

INTRODUCTION..... 1

    1.0. Introduction ..... 1

    1.1. Background of the study ..... 1

    1.2. Problem statement ..... 4

    1.3. Main research question..... 5

    1.4. Main objective of the study..... 5

    1.5. Significance of the study ..... 6

    1.6. Conceptual framework ..... 7

    1.7. Theoretical framework of the study ..... 9

    1.8. Organization of the study ..... 11

    1.9. Definition of terms ..... 11

    1.10. Limitations of the study..... 12

CHAPTER TWO..... 13

    LITERATURE REVIEW..... 13

CHAPTER THREE..... 52

    METHODOLOGY..... 52

    3.0. Introduction ..... 52

    3.1. Profile of the study area ..... 52

    3.2. Type of study..... 57

    3.3. Study design ..... 58

    3.4. Target population ..... 58

    3.5. Sampling technique ..... 59



3.6.	Sample size determination .....	61
3.7.	Data collection methods .....	62
3.8.	Data collection tools.....	64
3.9.	Study variables .....	65
3.10.	Data analysis and presentation .....	67
3.11.	Validity and reliability of data collection tools .....	68
3.12.	Ethical consideration .....	69
CHAPTER FOUR.....		70
RESULTS.....		70
4.1.	Socio-demographic characteristics of respondents .....	71
4.2.	CHPS performance in relation to maternal and child nutrition healthcare services .....	75
4.3.	Prevalence of optimal maternal and child feeding indicators in CHPS zones .....	88
4.4.	Factors associated with optimal maternal and child feeding indicators in CHPS zones..	91
4.5.	Strategies to strengthen CHPS health care services delivery .....	112
CHAPTER FIVE.....		125
DISCUSSION .....		125
CHAPTER SIX .....		144
CONCLUSIONS AND RECOMMENDATIONS .....		144
6.1.	Conclusions .....	144
6.2.	Recommendations .....	145
REFERENCES.....		146
APPENDICES.....		158





**LIST OF TABLES**

Table 4. 1: Socio-demographic characteristics of study participants ..... 72

Table 4. 2: CHPS compounds providing nutrition services to pregnant women during ANC..... 78

Table 4. 3: CHPS compounds providing nutrition related services as part of PMTCT..... 79

Table 4. 4: CHPS compounds providing nutrition related services at delivery ..... 80

Table 4. 5: CHPS compounds providing nutrition services to children ..... 80

Table 4. 6: CHPS compounds using different strategies to deliver nutrition specific interventions  
..... 81

Table 4. 7: Categories of staff living in CHPS compounds on the day of survey ..... 82

Table 4. 8: CHPS zones with at least one health staff trained in nutrition related area in the last  
two years ..... 83

Table 4. 9: CHPS compounds with equipment available and functional ..... 84

Table 4. 10: CHPS compounds with maternal and child nutrition related guidelines/documents 85

Table 4. 11: CHPS compounds with essential maternal medicines..... 86

Table 4. 12: CHPS compounds with essential child health medicines ..... 86

Table 4. 13: CHPS compounds who experienced stock-out of essential medicines in the past 3  
months..... 87

Table 4. 14: Household Food Consumption Score (FCS), Minimum Dietary Diversity (MDD),  
Minimum Meal Frequency (MMF) and Minimum Acceptable Diet (MAD)..... 89

Table 4. 15: Factors associated with household Food Consumption Score (FCS)..... 93

Table 4. 16: Factors associated with minimum dietary diversity (MDD) ..... 98

Table 4. 17: Factors associated with minimum acceptable diet..... 102

Table 4. 18: Determinants of household food consumption score (FCS)..... 107



Table 4. 19: Determinants of minimum dietary diversity of children ..... 109

Table 4. 20: Determinants of minimum acceptable diet of children..... 111



**LIST OF FIGURES**

Figure 3. 1. Map of the study area ..... 53

Figure 4. 1: Performance index of CHPS.....77

Figure 4. 2: Maternal knowledge on infant feeding..... 90



## ABBREVIATIONS

ANC: Antenatal Care

BMI: Body Mass Index

CHO: Community Health Officer

CHPS: Community-based Health Planning and Services

CHV: Community Health Volunteer

MHA: Municipal Health Administration

MHMT: Municipal Health Management Team

DHS: Demographic and Health Survey

FAO: Food and Agriculture Organization

FCS: Food Consumption Score

GDHS: Ghana Demographic and Health Survey

GHS: Ghana Health Service

MAD: Minimum Acceptable Diet

MCHIP: Maternal and Child Health and Nutrition Improvement Project

MDD: Minimum Dietary Diversity

MMF: Minimum Meal Frequency

MoH: Ministry of Health

OPD: Outpatient Department

PHC: Primary Health Care

PNC: Postnatal Care

WFP: World Food Program



## CHAPTER ONE

### INTRODUCTION

#### 1.0. Introduction

This chapter presents a general overview of what the study is about. It gives the background of the study and presents a description of the research problem. This section also specifies the study objectives and the significance of the study. The chapter also gives a description of the conceptual and theoretical frameworks of the study and provides definition of the study terms and the limitations of the study.

#### 1.1. Background of the study

Primary health care (PHC) is defined by the Alma-Ata Declaration (1978: 3) as “essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination.” The primary health care campaign began as a global endeavor around the 1960s when it became clear that hospitals were not better improving the health of the populations they were serving (Cueto, 2004). As a result of the global paradigm toward primary health care, Ghana adopted a strategy of health service delivery at the community level using community health workers called community clinic attendants and traditional birth attendants in 1977 (CHPS Policy, 2016). The move by Ghana to deliver health services at the community level using community health workers came much earlier before the Alma Ata Declaration in 1978 of “Health for All by year 2000” which emphasized primary health care (CHPS Policy, 2016).



In 1996, the health sector in Ghana launched a reform in the health care delivery system with focus on developing health systems especially at the district and sub-district levels (CHPS Policy, 2016). Since then, the health sector in Ghana is believed to always strive for strategies to deliver health care directly to communities. One of such efforts to deliver health care direct to communities resulted in the adoption of community-based health planning and services (CHPS) concept which came to the forefront in Ghana's health sector as a strategy for delivering essential health care directly to communities in Ghana and even down to the individual households. The CHPS concept within the health sector in Ghana is a national effort to improve "access to quality essential health care services" and improve "utilization" of essential basic health care services (CHPS Policy, 2016). The essential health care services package of the CHPS policy also include provision of optimal maternal and child nutrition health services for improved maternal and child nutrition health outcomes in rural communities (CHPS Policy, 2016).

As part of efforts to improve utilization of nutrition health care services in communities for improved maternal and child nutrition health outcomes, the World Bank in year 2014 approved grant to Ghana for a maternal and child health & nutrition improvement project (MCHIP) to be implemented using the community-based health planning and services (CHPS) delivery platform. The objective was to "improve utilization of community-based health and nutrition services by women of reproductive age" and "children under the age of two years" (World Bank, 2014: 9). This was to be achieved by "increasing availability of high impact health and nutrition interventions, and addressing access barriers using existing community-based health service delivery strategies and communications channels to inform, sensitize and motivate care-givers, community leaders and other key audiences" (World Bank, 2014: 9). By so doing, the project



was envisaged to “strengthen the delivery mechanisms for community health and nutrition services” towards “improved maternal and child health outcomes” (World Bank, 2014). The main strategy was to bolster CHPS delivery platform by spreading the project operation to cover all regions of Ghana in the hope of reaching a maximum number of beneficiaries. Among other regions, the project was to be implemented in all communities in the upper west to “address the inequity gap” and “increase utilization” of “maternal and child” nutrition health care services. With the implementation of CHPS program, Ghana’s health care delivery efforts have seen some improvement. The evidence shows that antenatal care (ANC) coverage, immunizations, national rate of skilled delivery, outpatient department (OPD) attendance by insured clients has all improved with CHPS contributing closed to 5% to the total attendance at OPD nationwide (CHPS Policy, 2016). In spite of the progress made in increasing access to essential health care services and improving health outcomes, “inequity in health and disparities in health outcomes persist” and people still have “unaddressed health needs”, especially the poor and people living in vulnerable situations like rural communities (Astana Declaration, 2018). In October 2018, Heads of States and Governments met in Astana, Kazakhstan and reaffirmed their commitment to the “principles” and approach of “primary health care” emphasizing access by all to health care including promotive and preventive health care services which include maternal and child nutrition health care. However, CHPS which is the main strategy in Ghana for “delivering primary health care services” in rural communities seems to focus more on delivering only certain aspects of the minimum package of essential health services with little or no focus on other equally essential health care services such as the provision of adequate “maternal and child” nutrition health care services in rural communities. According to Ghana’s national community-based health planning and service policy directives, duty of care and minimum

package of services for maternal health should include; antenatal care, family planning and prevention of mother-to-child transmission of HIV. The policy further directs that the minimum package of services for neonatal and child health services should include; nutrition education and support, growth monitoring and promotion and community integrated management of childhood illnesses. The CHPS policy also emphasizes health education and counseling on healthy lifestyles and good nutrition especially for mothers and children. In view of the above, this study assessed the state of “maternal and child” nutrition health care services delivery in CHPS zones and CHPS contribution to “maternal and child nutrition indicators” in Jirapa Municipality of the Upper West Region of Ghana.

### **1.2.Problem statement**

The CHPS program in Ghana is also a strategy to promote maternal and child nutrition education and support, and to provide counseling on healthy lifestyles and good nutrition for mothers and children (CHPS Policy, 2016). Despite some progress in CHPS implementation to improved health outcomes, inequity in access to some “essential health care services” exist and Ghana is yet to be on track to meeting all the “maternal and child nutrition targets” (World Bank, 2014).

The GDHS, 2014 report revealed that “only 13% of children aged 6-23 months” in Ghana met the minimum standards set for “core infant and young child feeding practices”. The evidence also shows that micronutrient malnutrition is highly prevalent and persistent among Ghanaian women and children aged 1-59 months (GDHS, 2014). Other evidence suggests that feeding practices for children aged 6-23 months in Northern Ghana are “unlikely to meet” the WHO recommended standards (Saaka et al., 2015). The 2017/2018 “Ghana multiple indicator” cluster survey report revealed that only 14% of children aged 6-23 months in the upper west region met the minimum diet diversity (Ghana Statistical Service, 2018).



Since the implementation of the CHPS program in Ghana, several maternal and child health indicators have improved (CHPS Policy, 2016). However, documented evidence on CHPS program's contribution to maternal and child nutrition indicators are limited or non-existent. Therefore, this study assessed the performance of CHPS zones on maternal and child nutrition indicators.

### **1.3. Main research question**

What is the performance of CHPS zones on maternal and child nutrition indicators in Jirapa municipality?

#### **1.3.1. Specific research questions**

1. What is the state of CHPS performance in relation to maternal and child nutrition health care services delivery in Jirapa municipality?
2. What is the prevalence of optimal maternal and child feeding indicators in CHPS zones in Jirapa municipality?
3. What are the factors associated with optimal maternal and child feeding indicators in CHPS zones in Jirapa municipality?
4. What strategies can strengthen health care services delivery and improve maternal and child nutrition health promotion activities in CHPS zones in Jirapa municipality?

#### **1.4. Main objective of the study**

To assess the performance of CHPS zones on maternal and child nutrition indicators in Jirapa municipality.



#### **1.4.1. Specific research objectives**

1. To assess the state of CHPS performance in relation to maternal and child nutrition health care services delivery in Jirapa municipality
2. To estimate the prevalence of optimal maternal and child feeding indicators in CHPS zones in Jirapa municipality
3. To examine factors associated with optimal maternal and child feeding indicators in CHPS zones in Jirapa municipality
4. To identify strategies which can strengthen health care services delivery and improve maternal and child nutrition health promotion activities in CHPS zones in Jirapa municipality

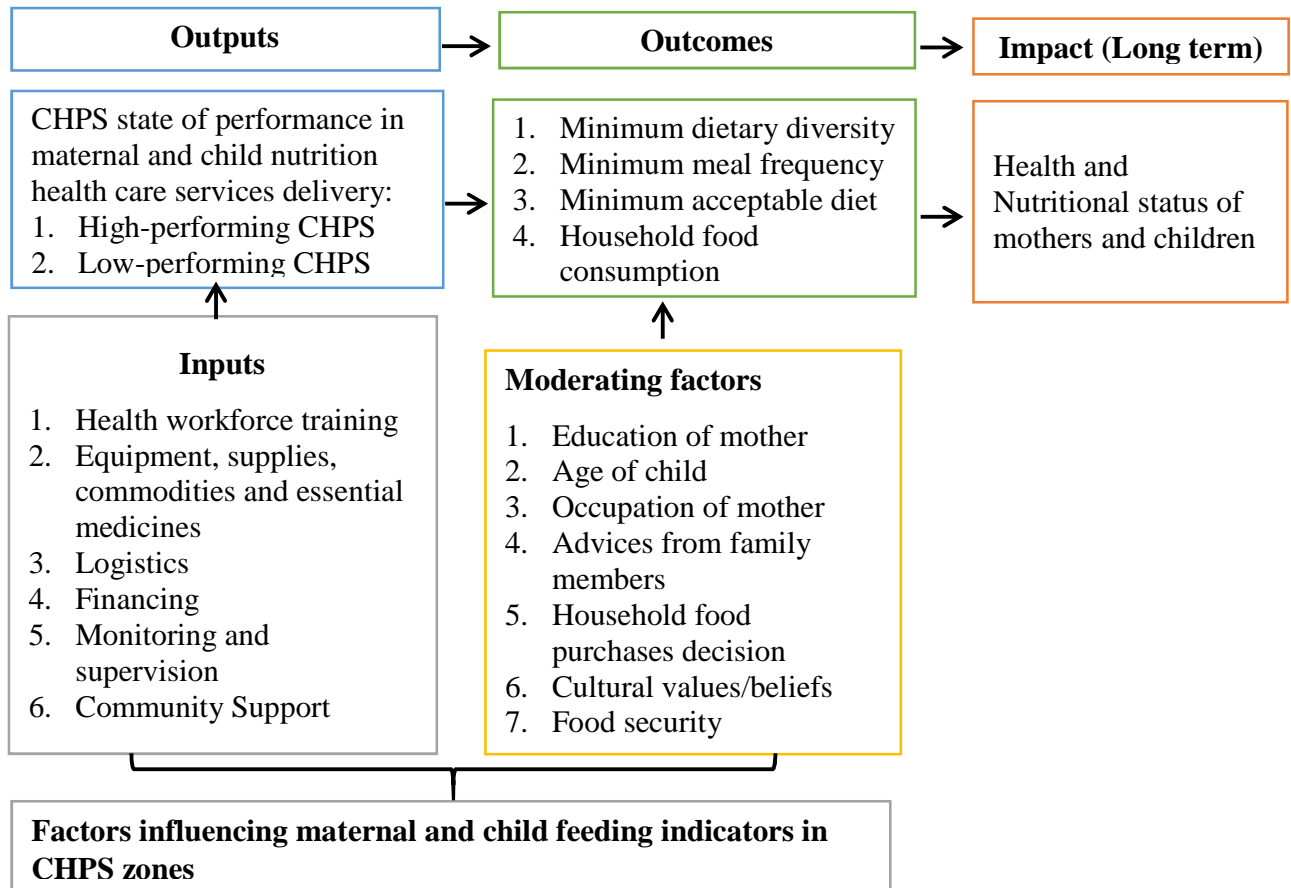
#### **1.5. Significance of the study**

The study evaluated nutrition-education and communication intervention activities in CHPS zones and as such, identified strategies which may help improve maternal and child nutrition health promotion activities in CHPS zones. The strategies identified in this study may provide valuable inputs for planning and implementation of maternal and child nutrition health promotion programs in CHPS zones. The study also identified determinants of optimal maternal and child feeding indicators in CHPS zones. The information about the determinants of optimal maternal and child feeding indicators in CHPS zones may help community health workers to tailor nutrition education messages in CHPS zones. The study also estimated the prevalence of maternal and child feeding indicators in CHPS zones. The information on prevalence of maternal and child feeding indicators in CHPS zones may serve as baseline data for further studies in CHPS zones in the Jirapa municipality on maternal and child nutrition.



### 1.6. Conceptual framework

Figure 1.6 is the researcher’s conceptual framework of the study on assessing maternal and child nutrition in CHPS zones.



**Figure 1.6. Conceptual framework**

Source: Developed by the researcher



### **1.6.1. Explanation of the conceptual framework**

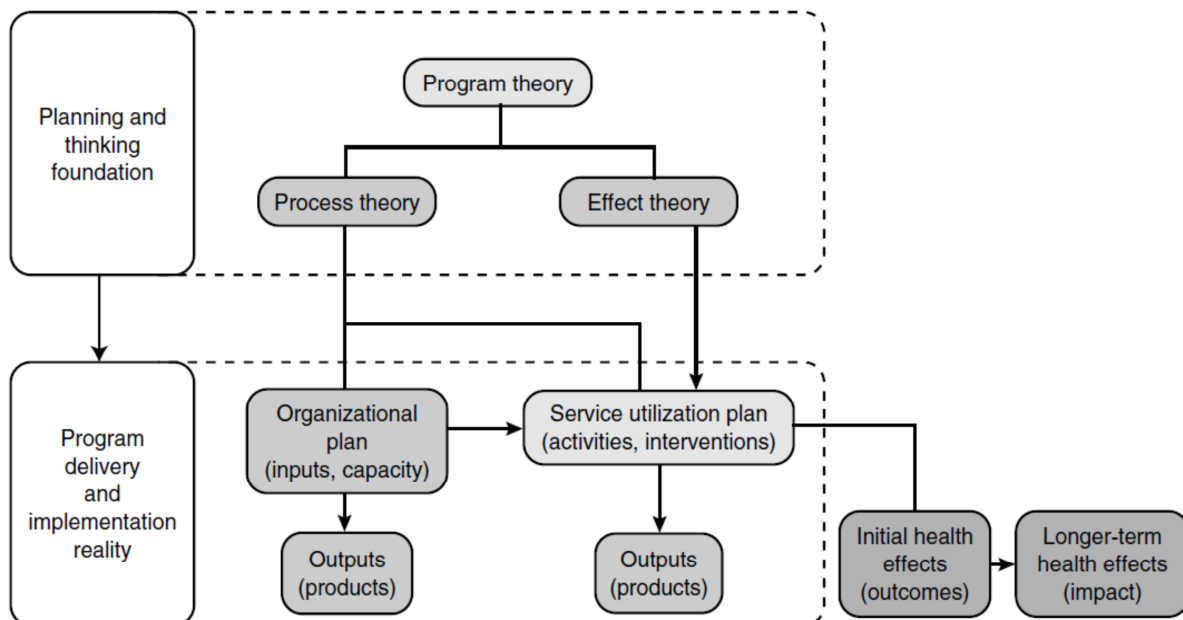
The conceptual framework presents health workforce, logistics, supplies and health financing among other health resources as health inputs for health care services delivery. These health inputs and processes reflect in health outputs which is CHPS performance in maternal and child nutrition health care services delivery in CHPS zones. The outputs from the health inputs described here as CHPS performance may also be described as maternal and child nutrition health care interventions in CHPS zones. The outputs are then reflected in “maternal and child” nutrition “health outcomes” such as “dietary diversity” score among children, proportion of children meeting “minimum meal frequency”, “minimum acceptable diet” and “household food” consumption score in CHPS zones. However, other factors which are outside the domain of the health inputs and processes also directly moderate these maternal and child nutrition health outcomes in CHPS zone. All these work together to determine dietary diversity, minimum meal frequency, minimum acceptable diet and household food consumption score. Therefore, efforts which seeks to improve on “maternal and child nutrition” health outcomes may have to focus on ensuring adequate availability of the health inputs for adequate maternal and child nutrition health care services delivery in CHPS zones while also focusing on addressing the moderating factors in order to mitigate their negative effects on the desired health outcomes. Finally, the outcomes reflect impact which is a manifestation of the health and nutrition status of mothers and children in the population. The impact (s) which is/are not within the scope of this study are long term effects of the health inputs, outputs and outcomes which manifest as health and nutrition status of mothers and children such as the “Body Mass Index” (BMI) of mothers, stunting in children, underweight and wasting among children.



The conceptual framework therefore brings together indicators and data sources and specify relationships between variables, thus from “inputs” to “outputs”, and “outcomes”, to “impact”. This framework allows for monitoring of CHPS zones maternal and child nutrition program inputs, processes and results. It also allows for assessment of CHPS performance in healthcare services delivery and serves as basis for evaluating the results of nutrition health investments in CHPS implementation for the purposes of informed decision taking among policy makers and leadership in healthcare services delivery.

### 1.7. Theoretical framework of the study

The study was founded on the “Program Theory”. The “need for a program theory has long been recognized by evaluators in the social sciences” and the use of program theory form “a sound basis for developing health program and guiding program evaluation” (Peter H. Rossi, Howard E. Freeman, 1999). “Program theory” is a “conceptual plan, with some details about what the program is and how it is expected to work” (Peter H. Rossi, Howard E. Freeman, 1999).



**Figure 1.9. Model of program theory**

Source: Modified by Issel, 2014, from “Peter H. Rossi, Howard E. Freeman”, M. W. L. (1999)



A theory as reported by Issel, 2014 is “a description of how something works”. “It is a set of statements or hypotheses about what will happen and, therefore, contains statements about the relationships among variables” (Issel, 2014). Health program planning involves creativity and intellectual efforts in order to clearly present what causes the health problem identified (Issel, 2014). This intellectual and creative efforts involve creating statements and identifying effective interventions in solving the health problem identified. These efforts may involve “past experience” and “personal preferences” and in some circumstances “wild guesses”. But a “more likely rational approach is to identify existing scientific knowledge and theories that can be used to develop a program theory”. The Program theory specifies the connections between the problem(s) to be resolved, program actions, and program goals (Foster et al., 2011). In that regard, it can serve as a foundation for evaluation questions and to acquaint the evaluator with the very essence of the program. Program theory may include stakeholders, particularly the views of program developers, managers, and deliverers as to why the program should work but should ultimately be adjusted to research findings and theories on the issue (Foster et al., 2011).

Other names for how the program is to work include “logic model”, “causal model”, “outcome line”, “program model”, and “action theory” (Issel, 2014; Peter H. Rossi, Howard E. Freeman, 1999). Despite the various names, the original idea point to the same concept of how the program is to work. Irrespective of whether a new health program is being developed or whether an evaluation program is being designed for ongoing health program, the program theory would usually play an “essential role”. The use of the words “outcome” and “impact” is “inconsistent across the literature and in practice” (Issel, 2014) . Therefore, for the purpose of this study, it may be appropriate to seek definitions rather than focus on the words. In the context of this study, “outcome” refers to “the immediate effects resulting from an intervention”, while “impact

refers to the long-term or cumulative effects attributable in part to the programmatic interventions”. The term “effect” generically refers to “changes or consequences of an intervention, regardless of whether the changes are immediate, proximal outcomes, or longer-term distal impacts” (Issel, 2014). The components of the program theory include resources and actions and interventions and outcomes. The statements about “resources” and “actions” is called “the process theory”, while the statement about “interventions” and “outcomes” is called “the effect theory”.

### **1.8. Organization of the study**

The study is organized into six chapters. Chapter one discussed the extent of the problem and addressed the significance of the research.

Chapter two presents review of related literature to the study while chapter three presents a description of the research methodology employed in carrying out the study.

Chapter four presents the study results while chapter five presents discussion of the study findings. Chapter six presents conclusions and recommendations drawn from the study.

### **1.9. Definition of terms**

The main terms used in the study are household food consumption Score (FCS), “minimum dietary diversity (MDD)”, “minimum meal frequency (MMF)” and “minimum acceptable diet (MAD)”. The FCS is defined according to WFP & FAO (2008) while the MDD, MMF and MAD are defined according to WHO (2010) definition of “indicators for assessing infant and young child feeding practices”.

**Household food consumption score:** “Aggregate household-level data on the diversity and frequency of food groups consumed over the previous seven days”.





**Minimum dietary diversity:** “Proportion of children 6-23 months of age who receive foods from 4 or more food groups”

**Minimum meal frequency:** “Proportion of breastfed and non-breastfed children 6-23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.”

For breastfed children:

- “2–3 times for breastfed infants 6–8 months”
- “3–4 times for breastfed infants 9–23 months”

For non-breastfed children:

- “4 times for non-breastfed children 6–24 months (including milk feeds)”

**Minimum acceptable diet:** “Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk)”: calculated from the following two fractions;

“Breastfed children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day/ Breastfed children 6–23 months of age”

And “Non-breastfed children 6–23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day/Non-breastfed children 6–23 months of age.”

### **1.10. Limitations of the study**

The study was conducted for only CHPS with compounds in Jirapa municipality of the upper west region of Ghana. Consequently, the findings from the study may not be generalized to other CHPS zones. The data for the study was collected from April to June as such may adduce some seasonal connotation. Due to time and resources constrains, the study did not cover all mothers in CHPS zones. Convenience sampling was used in the study.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0. Introduction

This chapter presents a review of literature related to the study. The literature provides evidence which relate to the main constructs of the study. In context, the reviewed literature focuses on the basis for primary health care; the primary health care approach; post Alma-Ata experience; primary health care in Ghana; trends in CHPS implementation, summary of CHPS policy directives; nutrition related problems among mothers and children in rural communities; determinants of maternal and child feeding indicators and measures to mainstream maternal and child nutrition health promotion activities in CHPS zones. The reviewed literature serves as basis to compare the study findings and draw meaningful conclusions and make guided recommendations to facilitate informed decisions in CHPS zones.

#### 2.1. Basis for primary health care (PHC)

An international conference on primary health care (PHC) was held in Alma-Ata in the year 1978 which international leaders expressed the need for all “Governments”, all health professionals, all “development workers” and the “world community” to “protect and promote the health” and wellbeing of “all the people of the world”. The declaration of the meeting in Alma-Ata recognized PHC as the key to attaining health for all people. *“It forms an integral part both of the country’s health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family, and the community with the national health system, bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process”* (Alma-ata, 1978: 3,16).





The international conference on PHC held in Alma-Ata also recognized that the action of the health sector, including other social and economic sectors are required for the “attainment of the highest possible level of health” (Alma-ata, 1978). The declaration of the Alma-Ata meeting on PHC identified substantial “inequality in access to health care” and lamented the lack of equality in the “health status of the people” especially between the “developed and developing countries” and even within countries (Alma-ata, 1978). “Primary health care” was believed to always “address” the key health issues in the community ranging from health promotion, health prevention and curative and rehabilitative health care services (Alma-ata, 1978). Some of these preventive, promotive and curative health care services include health education about current health “problems” and how to “prevent and control” them; they may also include the promotion of access to adequate food and nutrition and “safe water and basic sanitation” and essential maternal and “child health care” services including “immunizations”; “family planning”; the prevention and “control of endemic diseases”; “appropriate treatment of diseases and injuries”; and “provision of essential drugs” (Alma-ata, 1978). Beside the health sector, primary health care also include all sectors which provide health sensitive services such as “agriculture, animal husbandry, food, industry, education, housing, public works” and communications among other sectors (Alma-ata, 1978). These suggest that multifaceted efforts may be required for “primary health care” agenda to be completely successful in any setting.

## **2.2. Primary health care approach**

The Alma-Ata declaration of 1978 described “primary health care” as a realistic approach to making “essential health care universally accessible to individuals” and households and also acceptable and at low price with their “full participation”. It addresses the primary health issues inside the community by offering promotive, preventive and rehabilitative serves including promotion of optimal nutrition and maternal and child care (Alma-ata, 1978). “Primary health

care” is brought by way of “community health workers” with support from the community and the right of individuals or groups in the community to “participate in the planning and implementation of their health care”. The skills that the community health workers require by way of their training for effective health care service delivery may vary from one point to the other depending on the precise form of “primary health care” being provided (Alma-ata, 1978). Whatever their stage of ability to provide health care services, it is vital that they apprehend the actual “health needs” of the communities they serve (Alma-ata, 1978). The PHC concept therefore require community health officers to live within the community they are serving and strive to gain the confidence of the people in the community. Hence lack of community confidence in community health workers may negatively affect primary health care efforts.

### **2.3. Post Alma-ata experience**

Since the Declaration of Alma-Ata in 1978, many countries and organizations including the “World Health Organization” and the “United Nations Children’s Fund (UNICEF)” had been working on strategies to provide primary health care (WHO, 2018). In support of progress in primary health care, WHO in 2018 commissioned series of various case studies from various countries that have adopted different aspects of primary health care reform over the past 40 years. The WHO case series also show some common challenges in primary health care reform and provide guidance about what worked well for stakeholders and policymakers who are committed to transform the health sector using the primary health care principle. The case series include those that “focus on health sector reform”, and those using the “health in all policies (HiAP) approach” (WHO, 2018) summarized as follows;

**Table 2. 1: Case series on commitment to Primary Health Care**

Country	Case
Australia	Lessons from 10 years of HiAP in South Australia
Brazil	The Mais Medicos Programme
Canada	Quebec's policy of prevention in health, a HiAP approach
China	Multidisciplinary teams and integrated service delivery across levels of care
Egypt	Health sector reform
El Salvador	Territorial community teams
Estonia	The development of family practice to support universal health coverage
Finland	How to take into account health, well-being and equity in all sectors
Ghana	Community engagement, financial protection and expanding rural access
Jamaica	Development of workforce for first level of care
Kazakhstan	Technology to support disease management in primary care
Samoa	Engaging people for health promotion
Sri Lanka	Community-based workforce development for maternal and child health
Sudan	HiAP experience
Suriname	Reducing the burden of disease and health inequity through HiAP
Thailand	Development of primary care
Turkey	Family practice for quality in universal health coverage
Viet Nam	Improving equity in access to primary care

Source: (WHO, 2018)





The primary health care reforms in the countries that adopted the PHC approach improved on many health care indicators. Some of which include: “improving access to well-trained community health workers”; “widening the scope of services offered in communities”; coordinating across levels of service and integrating non-health sectors”; and “providing higher quality, person-focused care” (WHO, 2018). According to WHO, the interventions are generally similar in form but “implementation required local adaptation, community engagement and long-term partnerships” (WHO, 2018). The main principle of the international conference declaration at Alma-Ata is on adaptation from local context and ownership by community (Alma-ata, 1978). The WHO case series across the countries show that PHC “flourished when implemented with meaningful community engagement” (WHO, 2018). What make community engagement meaningful is locally determined just as any other aspect of primary health care. The WHO case series report suggest that “broad and deep engagement” were found to be effective in Samoa. The case series report also revealed that another meaningful community engagement is the use of “community practitioners who originate from the community” and was found to be effective in the Islamic Republic of Iran where the country assigned community practitioners important roles to provide “health education” and “maternal and child health services” among others. Also, proceeding from the “Alma-Ata declaration”, “primary health care” was adopted in Lesotho in 1979, and “community health workers” (CHWs) were used to increase access to health care, particularly to reach people in “underserved rural areas” (Seutloali et al., 1986). Seutloali et al., (1986) conducted qualitative study on “community health” care workers (CHWs) experience in “health promotion” activities in Lesotho and found that the roles of “community health workers” in “health promotion” activities included “basic first aid and home-based care” and health behavior change communication. The study concluded that CHWs benefit health promotion and



health promotion activities in communities. The study also observed that though CHWs had adequate understanding of their duties and responsibilities, they did not “fully understand” health advocacy and did not consider advocacy as part of their roles (Seutloali et al., 1986).

Similarly in Thailand, mandatory rural service, financial incentives, social recognition and well-equipped workplaces to draw non-local providers to rural areas and to encourage them to stay in those areas is the main strategy used (WHO, 2018). In El Salvador, “family health teams use data from their mobile ehealth records to identify and address local causes of disease”, as such interventions are “tailored to the real-time needs of the community” (WHO, 2018). The WHO 2018 case series of community country studies on progress in PHC shows clearly that the “communities are involved from the ground up” and people “participate individually” or “collectively in the planning and implementation of their health”, literally, in the case of Ghana where the communities are responsible to provide the land for the construction of the CHPS compound (CHPS Policy, 2016).

Over the last “40 years since the Alma-Ata declaration” on PHC in 1978, progress has been made (Astana Declaration, 2018) in increasing access to essential health care services and improving health outcomes. Notwithstanding the progress, “inequity in health and disparities in health outcomes persist” and people still have “unaddressed health needs”, especially the poor and people living in vulnerable situations like rural communities (Astana Declaration, 2018). Also, changes in “disease burden” resulted in “shift in roles” of “community health workers” and this affected “primary health care” activities which focus on “preventive health care” such as maternal and child nutrition health education (Seutloali et al., 1986). The evidence shows that community health workers “lack consistent financial incentives and supplies” and are overwhelmed with “work overload” (Seutloali et al., 1986). These challenges may sometimes

serve as a disincentive for primary health care workers to adequately carry out their work and as such could compromise the quality of work and discourage community involvement in health care service delivery.

In October 2018, Heads of States and Governments met in Astana, Kazakhstan and reaffirmed their commitment to the principles and “approach” of the “Alma-Ata declaration” on “primary health care”. The Astana declaration on PHC emphasize access by all to health care including promotive, “preventive, curative and rehabilitative services”. The declaration also identified the need to improve on areas such as “shortage and uneven distribution of health workers”; to improve “knowledge and capacity-building” for primary health care workforce; and to improve the delivery of health services and care. The Astana declaration also stressed the need to continue to invest in the “education, training, recruitment, development, motivation and retention of the PHC workforce, with an appropriate skill mix” and “strive for the retention and availability of the PHC workforce in rural, remote and less developed areas” (Astana Declaration, 2018: 8). Available scientific reports have shown that community-health-worker programs depend on “the provision of basic toolkits”, “steady and reliable supply of key commodities” and the “training of health workforce” (Bhutta & Black, 2013). It has also been reported that in “primary health care” setting such as CHPS health care, the key challenges to effective program implementation are “lack of adequate supplies” and “frequent depletion of necessary stock” (Bhutta & Black, 2013). Consequently, it is essential to continue to examine the state of functionality of primary health care programs in order to ascertain readiness and availability of services and essential logistics and supplies for adequate health care delivery such as the provision of optimal maternal and child nutrition health care in CHPS zones in Ghana.





#### **2.4. Primary health care in Ghana**

In the 1970s, the Government of Ghana in collaboration with “religious mission hospitals” delivered health care services in “rural and underserved areas” through “mobile clinics” and use of “village health workers” for primary health care delivery (PRIMASYS, 2017). Evidence from “Brong Ahafo Basic Health Services Project”, “Danfa Comprehensive Rural Health and Family Planning Project” (Ampofo et al., 1976) and “Brong Ahafo Rural Integrated Development Project” constitute the basis for the design of “primary health care” strategy in Ghana adopted in 1979 (PRIMASYS, 2017). Subsequently in the 1990s, Ghana’s Ministry of Health instituted the training of “public health practitioners” to provide needed “leadership” for primary health care (PRIMASYS, 2017). In 1994, the Government of Ghana through the “National Development Planning Commission” developed the “National Development Policy Framework” (NDPF) which was “set at year 2020, or 25 years from the start of the program in 1995” (NDPC, 1994). In response to the Government of Ghana Vision 2020 strategy which was set for economic and social transformation for improvements in the quality of all aspects of life in Ghana (NDPC, 1994), the Ministry of Health developed the “Medium Term Health Strategy” and embarked on “health sector reforms” and adoption of the health sector-wide approach (PRIMASYS, 2017) .

In 1996, the Health Sector in Ghana launched a reform in the health care delivery system with focus on developing health systems especially at the “district and sub-district levels” (CHPS Policy, 2016). Since then, the health sector in Ghana has always worked on “strategies” to deliver health care directly to rural communities. Consequently, the “community-based health planning and services (CHPS)” concept came to the forefront in Ghana’s health sector as the main strategy for delivering care directly to communities in Ghana and even down to the individual households (Awoonor-Williams et al., 2013; Binka et al., 2007; CHPS Policy, 2016;





Phillips, Jones, & Miller, 2003; Phillips et al., 2006). Research findings from Navrongo “Community Health and Family Planning Project” informed the development of the national CHPS strategy in 2000 (Binka et al., 2007). The “Community Health and Family Planning Project (CHFP)” was launched in Navrongo as a “three-village pilot” in 1994 and “scaled up to a district-wide factorial trial in 1996” (Binka et al., 2007). The purpose of the said project was to “determine the impact of deploying nurses and volunteers to village locations on demographic and health outcomes”. The project strategies tested the impact of “community mobilization with volunteer services vs. deploying nurses to communities vs. the joint effect of both sets of strategies combined”. A fourth cell served as a “comparison area”. Therefore, the “Navrongo combined nurse and volunteer cell” has become the “national model for community health services” (Binka et al., 2007). The evidence of the Navrongo experiment showed that “posting nurses to community locations reduced childhood mortality rates by over half in 3 years” and “accelerated attainment of the childhood-survival millennium development goal (MDG) in the study areas” relative to “trends observed in comparison areas” (Binka et al., 2007). The investigators concluded based on evidence from the project that “posting nurses to communities can dramatically accelerate” the “pace of progress in achieving childhood-survival” (Binka et al., 2007).

The Navrongo experiment was successfully replicated in Nkwanta District, located in the Volta region of southeastern Ghana. The Nkwanta initiative also showed potential for “changing clinic-based primary care to a system” based on the “Navrongo experimental model of community-based services”(Awoonor-williams et al., 2003). The successful replication in Nkwanta suggested that the Navrongo experience is “relevant to rural impoverished districts elsewhere in Ghana”(Awoonor-williams et al., 2003). By 1999, the health sector in Ghana convened

conferences to deliberate on the “continuing research outcomes of Navrongo and the operational success of Nkwanta” (Phillips, Jones, Nyongator, et al., 2003). This indeed informed the decision to create a “national program”, known as the “Community-based Health and Planning Services” (CHPS) initiative, for “fostering the rapid dissemination” of the Navrongo model throughout Ghana (Phillips, Jones, Nyongator, et al., 2003). The “Community-Based Health Planning and Services (CHPS)” program in Ghana uses trained and oriented community health nurses posted to CHPS zones as “community health officers (CHOs)” (CHPS Policy, 2016). The CHOs are required to live in the community and deliver health care services, thus, the CHOs speak the local language.

## **2.5. Trends in CHPS implementation in Ghana**

Though the CHPS initiative was supported by Government and some organizations, the CHPS strategy implementation encountered various challenges such as “poor community mobilization”; “weak capacity of the sub-districts to supervise and provide technical support”; “lack of alignment of vertical program”; “inadequate investment in CHPS infrastructure and equipment”; and “absence of dedicated funding for operations” at CHPS level (PRIMASYS, 2017: 5). In general, challenges regarding early era CHPS implementation related to issues of “manpower numbers, training, service capacity, and deployment” of community health officers (Awoonor-Williams et al., 2013). Notably, community health officers in the early era were not prepared to deliver some “essential health services” addressing maternal and child health (Awoonor-Williams et al., 2013). Also, the initial training program for community health officers did not equip them with adequate “skills” in engaging with the “community” (Awoonor-Williams et al., 2013). Consequently, the Ghana Health Service (GHS) started a project in 2009 known as the “Ghana Essential Health Intervention Program (GEHIP)” focused on identifying



barriers to CHPS implementation (Awoonor-Williams et al., 2013). Though the project “trained” “community health officers” in some “strategies” for service delivery including “strategies for saving newborn lives”; “lack of leadership and political engagement”, as well as “absence of a budget line item for CHPS”, resulted in “inadequate resources and a lack of focus on and clarity about the program” (Awoonor-Williams et al., 2013: 124, 125).

It has been reported that the “implementation” of CHPS is “fraught with several policy and systems level challenges” (CHPS Policy, 2016). Various reviews done on CHPS points to “a lack of clear policy direction”, “unclear definitions” and “an unending conceptual debate”. Issues bordering on “effective leadership and technical direction” as well as “planning and budgeting for CHPS” right from the community level to the “district”, “regional” and “national” levels has also been reported as inadequate (CHPS Policy, 2016). Similarly, the dissemination of “written guidelines to CHPS zones has been reported as inadequate and some guidelines are “difficult to understand” by the CHOs serving in CHPS zone (CHPS Policy, 2016). Consequently, many CHOs who are at the service delivery point raise concern about “confusion in directives received” at the CHPS level (CHPS Policy, 2016). Other aspects which further complicate issues in relation to CHPS strategy is the introduction of the term “functional CHPS zone”. Under the “functional CHPS zone” label, “compounds are no longer a mandatory requirement” yet “difficult to determine precisely what functional means” (Awoonor-williams et al., 2004; CHPS Policy, 2016).

In Kintampo North municipality of Ghana, a descriptive cross-sectional study was conducted to “examine the extent of patronage of CHPS compounds”, factors associated with the use of CHPS compounds and “challenges faced by community members” regarding the use of CHPS compounds. The evidences presented from the study revealed that “CHPS compounds are highly



patronized” (Wiru et al., 2017). The study however, observed that there was shortage of commodities such as essentials medicine (41.5%) and absenteeism of community health officers in some CHPS zones. (Wiru et al., 2017). In both the Western and Central regions, an assessment report revealed that “CHPS compounds” were in a “poor state of repair” and some “CHPS compounds” were “partially equipped and without accommodation” while “community health officers” complained of “lack of operations running budget” (MoH, 2014). It has also been purported that in some CHPS zones, new services are being introduced and now supervisors and communities come to expect CHOs to deliver clinical services in the community using the CHPS concept (MoH, 2014). Probably, these experiences in CHPS zones are as a result of inappropriate or inadequate communication and engagement with community leading to lack of understanding among community members about the difference between community-based health service and services at a higher level health facility. The “community-based health planning and services” implementation also continue to be confronted with logistic challenges “resulting in many CHNs not residing in CHPS zones” (CHPS Policy, 2016). In view of these challenges, questions may arise as to whether the current logistics and amenities available in CHPS zones are adequate for effective continuous health care delivery particularly with regards to maternal and child nutrition health care services. Other issues which also affect service delivery in CHPS zones include “dissatisfaction” of CHOs with the “location and length of their current placement” and “no policy on how long a CHN can remain in a deprived community” as well as “no incentives in place to reward those serving in deprived areas” (CHPS Policy, 2016). Also, another neglected area yet highly substantial in contributing to CHPS health care service delivery is the “selection, training and retention of volunteers” in the “CHPS deployment framework” (MoH, 2014). It is estimated that “55% of CHPS zones have no regularly trained active volunteers working with



CHOs on a regular basis” (MoH, 2014). The low availability of regularly trained active volunteers in CHPS zones may be attributed to several factors. One of such factors is as a result of “different programs drawing on volunteer services” leading to “volunteers implementing different uncoordinated services” (MoH, 2014). It has been shown that “there is no policy on reward and incentives for these volunteers leading to volunteer fatigue” and now “various programs introducing cash incentives” (Awoonor-williams et al., 2004; CHPS Policy, 2016). Hence, the “volunteer system” is distorted in several communities resulting in “some volunteers demanding cash for services” (Awoonor-williams et al., 2004; CHPS Policy, 2016). Since volunteer involvement in service delivery has been reported as an important aspect of service delivery in communities, it may be important to continue to explore ways to improve community volunteers’ contribution to health care services delivery. This study identified strategies to improve on community volunteers’ contribution to primary health care services delivery in communities. Another important issue is “community health management committees (CHMCs)”. Though established in most “CHPS zones”, the members are “inactive or not trained in about 65% of the CHPS zones” (MoH, 2014). “Community entry and appropriate community mobilization to support the CHPS program” are also purported almost neglected. There are likewise issues of “security and availability of water and electricity” in CHPS zones which are all argued to affect health service delivery in CHPS zones (CHPS Policy, 2016). Financing CHPS is yet another aspect. Different “development partners” have some “funds for supporting the development and scale up of CHPS” but there is “no coordination and harmonization of the various funds” (CHPS Policy, 2016). It has been observed that the “National Health Insurance Authority (NHIA) does not reimburse for CHPS services directly” (CHPS Policy, 2016). Where



services are provided and qualify for NHIA reimbursement, “the cost is claimed through the health centers as part of the services provided by the health center” (CHPS Policy, 2016).

In CHPS zones, “community health committees” support and oversee the delivery of integrated primary care services by health workers and community volunteers (PRIMASYS, 2017). The community health committees in some CHPS zones are weak and need strengthening to support primary health care (PRIMASYS, 2017). The evidence also show decrease public expenditure on primary health care leading to inadequate logistics affecting effective service delivery in CHPS zones (PRIMASYS, 2017). The NHIS is the main source of funding for CHPS activities and delays in reimbursement of providers may affect quality of care thus community-based health care activities (PRIMASYS, 2017). Meanwhile, most “development partners” have started a process to eventually end their funding support to Ghana for between “2020 and 2022” (PRIMASYS, 2017).

Nevertheless, availability of trained primary health care workforce has improved due to “increased production from both public and private sectors” in Ghana but the distribution is “skewed’ towards urban areas, with “rural and deprived areas poorly staffed”, especially in the northern part of Ghana including the upper west region (PRIMASYS, 2017). Consequently, the increase in staff availability has not “translated into increased service coverage including maternal and child nutrition health care services because of lack of logistics and funds for operations” in CHPS zones (PRIMASYS, 2017).

Subsequently, the World Bank in year 2014 approved grant to Ghana for a “Maternal and Child Health & Nutrition Improvement Project” (MCHIP) to be implemented using the “community-based health planning and services (CHPS) delivery platform”. The objective was to “improve utilization of community-based health and nutrition services by women of reproductive age,

especially pregnant women, and children under the age of two years” (World Bank, 2014: 9). This was to be achieved by “increasing availability of high impact health and nutrition interventions, and addressing access barriers using existing community-based health service delivery strategies and communications channels to inform, sensitize and motivate care-givers, community leaders and other key audiences” (World Bank, 2014: 9). By so doing, the project was envisaged to “strengthen the delivery mechanisms for community health and nutrition services”. It was also believed to “enhance multi-sectoral coordination and collaboration and improve ownership and accountability of all stakeholder efforts towards improved maternal and child health outcomes”. The main strategy was to “bolster the community-based health planning and services (CHPS) delivery platform” by spreading the project operation to cover all regions of Ghana in the hope of reaching a “maximum number of beneficiaries”. Particularly in the northern, upper east, upper west and volta regions, the project was to be “implemented in all communities to address the inequity gap to increase utilization” while the “project will cover at least 50 percent of communities, targeting the poor and deprived areas based on the level of their health outcomes” in the remaining regions of Ghana (World Bank, 2014).

According to the World Bank (2014: 2) “international development association” project appraisal document for Ghana’s “Maternal and Child Health & Nutrition Improvement Project” (MCHIP) in CHPS zones, the key interventions which were believed to be “effectively delivered” using the “country’s well established community based health program” include: (i) “providing vitamin A supplementation which reaches only 56 percent of children under five and is one of the single most effective child survival interventions”; (ii) “addressing iron-deficiency anemia with over 87 percent of children from the lowest wealth quintile suffering from some form of anemia but only 16 percent receiving iron supplements”; (iii) “conducting de-worming



with a meager 21 percent of children under five from the lowest wealth quintile benefitting from treatment in contrast to close to 60 percent of their counterparts from the highest wealth quintile”; (iv) “strengthening growth monitoring to ensure early detection of malnourished children with 28 percent of children under five suffering from stunting”; (v) “promoting exclusive breast feeding during the first six months which stands at only 63 percent”; (vi) “boosting immunization coverage to reach the 20 percent of children 12-23 months old who are not fully immunized”; and (vii) “improving infant and child feeding practices”.

In view of the evidence presented in the literature and the existing challenges in CHPS implementation, it is only requiring to ask some very important questions regarding the package of essential health care services and CHPS continuous health care services delivery in communities; (1) What is the current state of CHPS performance in relation to maternal and child nutrition health care services delivery? (2) What is the prevalence of maternal and child nutrition indicators in CHPS zones? (3) Is CHPS current state of performance contributing to improving maternal and child nutrition indicators? (4) In what ways can CHPS health care services delivery be strengthened to improve maternal and child nutrition health promotion activities in the rural communities?. This study was undertaken in the Jirapa municipality of the upper west region of Ghana to help find answers to these important questions.



## **2.6. Summary on primary health care (PHC) in Ghana**

### **2.6.1. Summary on minimum package of services for PHC in Ghana**

The national community-based health planning and service policy” document directs that maternal health services in CHPS zones should include; “prevention of mother to child transmission (PMTCT)”, “family planning (FP)” and ANC (CHPS Policy, 2016). Also, the CHPS policy document directives requires that “neonatal and child health services” include; “nutrition education and support”, “growth monitoring and promotion” and “community integrated management of childhood illnesses”. The policy directives underscore the need for “health education and counseling on healthy lifestyles and good nutrition” especially for mothers and children.

### **2.6.2. Summary on human resources for PHC in Ghana**

The CHPS policy document in Ghana directs that there “shall be up to three (3) community health officers (CHOs) of appropriate staff mix assigned to a CHPS zone”. A CHO is defined as a “community health nurse (CHN) who successfully completes the prescribed in-service training and orientation and posted as a staff in a CHPS zone” (CHPS Policy, 2016). The policy describes a CHN as a staff trained by the “Nurses and Midwives Council and issued with the recognized specific license”. Depending on the “level of deprivation”, CHOs may serve in a particular CHPS zone for some period before they are eligible to be rotated out. “After three years the CHO is eligible for reposting” (CHPS Policy, 2016).

In order to ensure continuous professional development, the CHPS policy document pointed out that CHN grading system shall be organized across the country for “career progression for the certificate and diploma or any higher class of this cadre” (CHPS Policy, 2016). The policy also requires that condition of service and schemes be established to make the CHN professional



category attractive. It is also directed by the policy that “appropriate incentives scheme shall be developed and instituted to reward CHOs and volunteers depending on performance, duration of stay and category of deprivation of the CHPS zone”. Community Health Volunteers are also recognized as “integral part of CHPS zone service delivery”. “Each CHPS Community shall have at least two volunteers selected by the community and trained by the sub- district health team” (CHPS Policy, 2016). Though effective coverage and effect in health care delivery require availability of human resources and commodities, the provision of these alone may not be sufficient to ensure “effective coverage” and “effect” in rural communities. These may be supported with effective governance and assurance of the supply chain; health systems strengthening and attention to health care quality issues.

### **2.6.3. Summary on infrastructure, equipment and financing for PHC in Ghana**

The CHPS policy directive require that all CHPS compounds across the country be standardized, “equipped and furnished” according to the approved “standard list”. This according to the policy will ensure “efficiency and effectiveness” in the management and “maintenance of CHPS compounds” in the country. A “CHPS compound” is defined as “a basic structure consisting of accommodation of CHOs and a service delivery point” (CHPS Policy, 2016). In Ghana, financing and scaling up of CHPS is the responsibility of government (CHPS Policy, 2016). However, the policy also allows that additional funds may be mobilized through the Ministry of Health drawing from “allocation of the portion of National Health Insurance Fund” and also through “development partner contributions” including “establishment of a common funding basket” as well as “contributions from benefactors and philanthropists”. The CHPS policy clearly direct that “all services delivered in CHPS compounds shall be delivered free of charge at

the point of use” while “CHPS services on the NHIS benefit package shall be reimbursed” (CHPS Policy, 2016).

#### **2.6.4. Summary on supervision, monitoring and evaluation of PHC in Ghana**

The supervision of CHPS may be done by the district health administration team or sub-district team. The district director is required to serve as the “technical lead in the district” and report to the “District Chief Executive” and the “district assembly”. Therefore, the “responsibility for guiding service delivery in the CHPS zones” rest in the hands of the district director of health services (CHPS Policy, 2016). At the “sub-district” level, the officer in charge at the sub-district health center serve as the lead person and is expected to provide “direct supervision of CHOs” in the CHPS zone. The CHPS policy document requires that the district director should “delegate an appropriate officer to be responsible” in setting where public health center is not available. It is also required that “Medical officers” in the “district hospital” are assigned to “a number of sub-districts for which they shall have mentoring and technical supervision responsibility and shall visit a CHPS zone in their assigned sub-district at least once every quarter” (CHPS Policy, 2016).

### **2.7. Nutrition related problems among mothers and children in rural communities**

#### **2.7. 1. Poor dietary diversity**

“Dietary diversity” (DD) has been shown to be a critical aspect of an optimal diet (Ruel, 2003). Scientific evidence show that “dietary diversity” is a good and quick indicator of “nutrient adequacy” (micronutrient adequacy) of the diet especially for children (Steyn et al., 2006). The causes of malnutrition among mothers and children in Africa include “inadequate food intake and poor nutritional quality of diets” (Lartey, 2008). Though young children, especially 6-12



months of age need “nutrient dense complementary foods”, in “low-income countries”, their diet is usually “dominated by cereal-based porridges with low nutrient density and poor mineral bioavailability” (Dewey, 2013). The available evidence suggest that complementary diets are low in some nutrients mostly in “iron and zinc”. Typically in “resource-poor households in low income countries”, “complementary foods” are based almost “exclusively on plants” and are very often the “major source of energy” for infants and young children while animal-sourced foods consumption is “often low due to economic and religious concerns” (Gibson et al., 2010). “Suboptimal infant feeding practices, poor quality of complementary foods and micronutrient deficiencies have largely contributed to mortality among infants and young children” in Africa (Lartey, 2008). A study which assessed dietary diversity in Nigeria concluded that “dietary diversity is poor among women and recommended for focused efforts on dietary diversity in order to “improve maternal and child nutritional status” (Ajani, 2010). The evidence show that “between 5 and 20% of African women have a low Body Mass Index (BMI)” due to “chronic hunger” and the “prevalence of anaemia ranges from 21 to 80%”, with similarly “high values for both vitamin A and Zn deficiency levels” (Lartey, 2008).

Studies in developing countries validated “dietary diversity” against “nutrient adequacy” and confirmed the already well-documented evidence of positive association observed in developed countries (Black, 2003). In Fillipino, a study which assessed whether “dietary diversity scores” are good predictors of indicators of adequate micronutrient intake in children and found that “dietary diversity” score is a significant “predictor” of adequate micronutrient intake in the diets of children (Kennedy et al., 2007). Several studies have shown that “dietary diversity” is a good predictor of dietary quality among mothers, infants and young children and dietary diversity has also been shown to be associated with “increased nutrient adequacy of children and



adults”(Acham, 2012; Henjum et al., 2015; Kant, 1996; Moursi et al., 2008). Similarly, dietary diversity was assessed in relation to “micronutrient intake and variability among women” aged 19- 69 years in Gauteng province of South Africa. The study was cross-sectional and used “24-hour dietary recall” data and “Dietary Diversity Score (DDS)” from “food frequency questionnaire”. In the study, the “intake of micronutrients” was assessed as “Nutrient Adequacy Ratios” and “Mean Adequacy Ratios” using “Estimated Average Requirements” and “Adequate Intakes of these micronutrients”, using the “Institute of Medicine” recommendations. The result of the study presented “strong significantly positive statistical relationship between the “Nutrient Adequacy Ratios” of respective “micronutrients” as well as “Mean Adequacy Ratios” with the DDS. Comparisons within age-group revealed that women aged 36-years and above were “at-risk of low micronutrient intake”. Overall, there was a “strong relationship” between dietary diversity score and “micronutrient intake”, and there was also a statistically significant variation in intake between age-groups, and women aged 36-years and above were the most at-risk group for low micronutrient intake (Hedwig Acham, 2012). Likewise, another study in Nepal assessed the “adequacy of micronutrient intakes of lactating women” and the “relationships between micronutrient intake adequacy”, “dietary diversity” and “socio-demographic variables” (Henjum et al., 2015). Using multiple regression analyses, the evidence showed that the mean probability of dietary adequacy was “positively associated with energy intake, dietary diversity, women’s educational level and socioeconomic status” (Henjum et al., 2015). The study concluded that “low micronutrient intakes are probably explained by low dietary diversity” (Henjum et al., 2015).

The literature has also consistently reported positive association between dietary diversity and child growth in a number of countries. Studies in Indonesia determined the “relationship between



dietary diversity and child stunting” using a “maternal-reported checklist” of “food groups”, summed as a “household dietary diversity score”. Logistic regression models were constructed to test the association between dietary diversity and child stunting. The unadjusted model revealed that “higher dietary diversity scores were associated with lower likelihood of child stunting” (Mahmudiono et al., 2016). This relationship remained significant after adjustment for “family size, maternal literacy, food expenditure, breastfeeding, energy, and protein intake” (Mahmudiono et al., 2016). A very “strong association” was also found between “household-level dietary diversity and per capita consumption and energy availability” from a 10-country analysis suggesting that “dietary diversity could be a useful indicator of food security” measured in terms of “energy availability” (Black, 2003). Other available studies also reported significant “association between household dietary diversity and socioeconomic status” in some settings (Black, 2003). Similar evidence from Mali about the determinants of dietary diversity in an adult population confirmed “dietary diversity is associated with socioeconomic status” (Torheim et al., 2004). The growing interest in “household dietary diversity” against dietary quantity provide some opportunity for estimating “household food security” (Taruvunga et al., 2013). In South Africa in the Eastern Cape Province, household cross-sectional survey data from rural communities was used to estimate the determinants of rural “household dietary diversity”. Evidence from regression analysis results of the study demonstrated that “participation in irrigation schemes”, “gender”, “education”, “income”, “access to home gardens” and “ownership of small-livestock” has positive influence in the attainment of “high dietary diversity” (Taruvunga et al., 2013).

Part of the challenge to improving the nutritional status of mothers and children is how to “scale up” the available “interventions” to a point that will make an “impact” in the population (Lartey,



2008). The strategies for delivering and scale up of available interventions may vary from one context to the other. This raises important question as to what context specific measures and strategies are suitable for “implementation” and “scale up” of available effective maternal and child nutrition interventions in CHPS. This study therefore explored measures to improve maternal and child nutrition health promotion activities in CHPS zones for improved maternal and child nutrition outcomes.

### **2.7.2. Household food insecurity**

Food insecurity maybe another important nutrition problem in rural communities. Food security can be a “complex phenomenon” resulting from “multiple causes” such as “food availability”, “food accessibility”, “food utilization” and “food stability” (Darfour & Rosentrater, 2016). In Ghana, about 5% of the population are food insecure and about 2 million people are vulnerable to become food insecure (Darfour & Rosentrater, 2016). The Food and Agricultural Organization (FAO) examined the “food security situation” in Northern parts of Ghana and “how farmer households cope during food insecure periods” and concluded that although farmers in the northern regions cultivate “purposely to feed the household” and to “sell the surplus”, “food” is “not available” in the household “throughout the year” (FAO, 2008). They again found that on the average “staple foods produced lasted for seven months” (FAO, 2008). The mechanism by which households members cope during the months of food scarcity include “migration to southern Ghana for wage labor”, soliciting of “support from relatives and friends outside the regions”, “sales from livestock and household valuables” as well as “reduction of food intake and consumption of less preferred food” (FAO, 2008). Therefore, measures to improve the household food security situation in Northern Ghana may be an important aspect for improving maternal and child nutrition situation in Northern Ghana. However, there seems to be little data

reporting on the food security situation in CHPS zones. This study therefore assessed household food consumption in CHPS zones as a proxy measure of food security to infer for maternal feeding at the household level. This knowledge may contribute positively to efforts towards improving the feeding and nutritional status of mothers in rural communities.

### **2.7.3. Poor economic, cultural and social conditions**

It has been established that barriers to health care access and equitable care in community-based settings “are related to poverty” (Bhutta, 2017). Lack of “qualified health workers” constitute part of the problem, however, “poor health outcomes” are also related to interconnected factors such as “maternal empowerment”; “sociocultural taboos”, and “care-seeking practices” and “behaviors during pregnancy and after delivery” (Bhutta & Black, 2013). Substantial evidence demonstrate that “food allocation” at the “intra-household level” is determined by “relative differences in household members income, bargaining power, food behaviors, social status, and interpersonal relationships” (Harris-fry et al., 2017). Available data point to household-level determinants of maternal and child nutrition which include “wealth, food security, occupation, land ownership, household size, religion / ethnicity /caste, education, and nutrition knowledge” (Harris-fry et al., 2017). A study which assessed challenges to implementation of “community-based management of acute malnutrition” in Tolon District of Northern Ghana revealed that barriers for mothers accessing “Community-based Management of Acute Malnutrition (CMAM)” services include; “cultural/social barriers”; “no money for transportation and food” (Yeboah & Kissiwah, 2017). Other challenges which affect access to nutrition health care services relate to issues which affect health workers service delivery such as; “poor logistics”; “problem transporting logistics to the various centres; “few teaching and learning materials for educating mothers”, “illiteracy/ poor enlightenment of the community”, “no incentives for





community health volunteers” (CHVs), and “ridiculing of CHVs by the communities” (Yeboah & Kisiwah, 2017). A study conducted in Nigeria identified barriers to effective primary healthcare which include; “mal-distribution of health care workers”; “inadequate training facilities in parts of the country”; “vertical programs”; “low political commitment to implementation of approved health policies”; “differences in remuneration between levels of care”; “inequality in infrastructure that favor urban areas” and “poor working conditions” of primary healthcare officers (Ayuk, 2018). Recent findings point to “barriers to adequate nutrition during pregnancy” which include “cultural beliefs related to knowledge of quantity of food to eat during pregnancy, amount of weight to gain during pregnancy, and eating down during pregnancy for fear of delivering a large baby” (Kavle & Landry, 2018). The evidence contend that “foods considered inappropriate for consumption during pregnancy or lactation contribute to food restriction” among mothers and food choice is influenced by “food aversions, economic constraints, and household food availability” (Kavle & Landry, 2018). Therefore, tailored nutrition education on diet for mothers and caregivers is an area which need attention (Kavle & Landry, 2018).

## **2.8. Prevalence and determinants of dietary diversity, minimum meal frequency and minimum acceptable diet**

In Ghana, data from the nationally representative 2008 “Ghana demographic and health survey” was used to explore “complementary feeding practices” and to identify risk factors for suboptimal “complementary feeding practices” using the WHO newly developed infant and young child feeding indicators. The result from the country-wide data analysis revealed that “46% and 51.4% of children aged 6-23 months met the minimum meal frequency and dietary diversity for breast-fed and non-breast-fed children respectively” and the “prevalence of



minimum acceptable diet for breast-fed children was 29.9%” (Issaka et al., 2014). Multivariate analysis of the data showed that compared with the Volta region, “children from the other administrative regions were less likely to meet the minimum dietary diversity”, minimum meal frequency and the minimum acceptable diet (Issaka et al., 2014). The evidence also showed that “household poverty, children whose mothers perceived their size to be smaller than average and children who were delivered at home were significantly less likely to meet the minimum dietary diversity requirement” and “children whose mothers did not have any postnatal check-ups were significantly less likely to meet the requirement for minimum acceptable diet” (Issaka et al., 2014). Consequently, the study concluded that the “prevalence of complementary feeding among children in Ghana is still below the WHO-recommended standard of 90 % coverage”. The most important risk factors identified in the study for inadequate complementary feeding practices include mothers not attending postnatal check-up, household poverty, cultural beliefs, delivery of babies at home and being a non-Christian mothers (Issaka et al., 2014). A similar study analyzed “complementary feeding practices” in four West African countries namely Ghana, Liberia, Nigeria and Sierra Leone using data from the most recent “Demographic and Health Surveys”. The study involved 12,623 children aged 6-23 months from the four Anglophone West African countries with 822 children from Ghana, 1458 children from Liberia, 8786 children from Nigeria and 1557 children from Sierra Leone. Multiple regression analysis was used to examine complementary feeding indicators against a set of “individual, household and community-level factors”. Evidence from multivariate analyses demonstrated that “lack of post-natal contacts with health workers, maternal illiteracy and geographical region were common determinants of delayed introduction of solid, semi-solid or soft foods across all four countries” (Issaka et al., 2015) . The predictors for “minimum dietary diversity, minimum meal frequency and minimum

acceptable diet from the work of Issaka et al., (2015) point to children aged 6-11 months, administrative/geographical region, poorer household income and limited access to media” (Issaka et al., 2015).

A cross-sectional study that was also conducted in Pakistan in two rural districts of Sindh province among mothers with children from 0 to 23 months of age found that Infant and Young Child Feeding (IYCF) practices were below the WHO recommended child feeding standard (Khan et al., 2017). “Infant and young child feeding” practices have been found to be associated with “maternal age, maternal illiteracy, poor household wealth status”, and unemployment (Khan et al., 2017). The evidence also suggest that mothers aged 25 to 29 years, mothers who are literates and mothers who have higher income are more likely to have an improved dietary diversity score (Khan et al., 2017). Further analysis suggest that mothers who are employed and mothers with higher income are more likely to have minimum acceptable diet (Khan et al., 2017). The work of Reinbott et al., (2016) also reported evidence that wealth and age of the child are determinants of child dietary diversity. The “older the child and or the wealthier the household”, the more “diverse the child’s diet” (Reinbott et al., 2016).

A similar study using cross-sectional samples from 50 Demographic and Health Surveys, recently reported that “children of both formally and informally employed women, compared to children of non-employed women, had higher odds of meeting minimum dietary diversity (MDD) and minimum meal frequency and minimum acceptable diet (MMF)” (Oddo & Ickes, 2018). The study recommended for promotion of formal employment for mothers as a strategy to improve “diet diversity and feeding frequency in Low and middle income countries (LMICs)” (Oddo & Ickes, 2018). Another cross-sectional study was conducted in a community-based practice area of urban health centres in Khalkhal city of North West Iran among mothers of



children 6-23 months of age on infant and young child feeding. The findings from the community-based cross-sectional survey revealed that “minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD)” were adequate in “42.3%, 42.7% and 30.9%”, respectively (Kamran et al., 2017). The study also maintained that “minimum dietary diversity” and “minimum acceptable diet” are significantly associated with the gender of a child, the type of delivery, the birth order of a child, the mother’s literacy and also health literacy. The study concluded that complementary feeding practices among majority of mothers are inadequate (Kamran et al., 2017). Suboptimal complementary feeding practices especially in the first years of life have a “detrimental impact on a child’s growth, health and development” (Issaka et al., 2015). Dietary diversity was also assessed in Nigeria using cross-sectional descriptive study design with a semi-structured questionnaire and 24-hour dietary recall section as the tool for data collection which involved 1,472 women. Overall 83% of the participants had average/medium dietary diversity score (DDS) while 16.5% had low dietary diversity score (Ajani, 2010).

Similar studies also examined associations between complementary feeding practices and health behavior and socio-demographic characteristics in Kenya, Uganda, and Tanzania using the most recent Demographic and Health Survey data from each country. The evidence presented from the three country study revealed that less than 40% of the children in Uganda and Tanzania had met the recommended minimum meal frequency and only 30-40% of children in Kenya, Tanzania and Uganda had consumed the minimum dietary diversity. Statistically significant associations for adequate complementary food diversity in at least one of the three countries included “children’s age, breastfeeding status, mother’s education level and working status, household wealth index, prenatal care visits, receiving vitamin A supplements, using modern contraceptives



and meal frequencies” (Gewa & Leslie, 2015). A community-based qualitative study was also conducted in a district in rural Uganda to “explore the barriers to the use of appropriate infant and young child feeding practices by primary caregivers”. The data was collected from primary caregivers of children aged 0-24 months using focus group discussions. The evidence from the qualitative study showed that the main “barriers to appropriate infant and young child-feeding” practices fall under four themes which include “caregiver’s knowledge about breastfeeding”, “caregiver’s knowledge about complimentary feeding”, “influence of culture custodians on the caregivers”, and “patterns and burden of other responsibilities the caregivers have in the household” (Nankumbi & Muliira, 2015). Fathers’ nutritional knowledge and practice have been reported to also be significantly related to children’s minimum dietary diversity (Bilal et al., 2016).

In Bauchi state, total of 720 mothers and fathers were selected from “households with at least one child under 5 years” to assess child feeding practices. The study reported that only 26.0% of children aged 6-23 months received the minimum acceptable diet and “mothers’ occupation, household size, and the number of children per household” are reported as “negative predictors of dietary diversity”. Infant and young child feeding practices in the “rural farming area were influenced by parents’ income and education” (Mercy Sosanya, Ayodele Gbemileke, Jeanne Freeland-Graves, n.d.). A cluster-randomized controlled trail in Bangladesh assessed the effect of “participatory women’s groups” on maternal and child health outcomes in rural Bangladesh” in relation to “child feeding” and “care-seeking behavior” and concluded that “participatory women’s groups can be successfully adapted to address health knowledge and practice in relation to child’s health” which can help to improve on child feeding indicators (Younes et al., 2015). Similarly, a cluster-randomized-controlled trial on “effectiveness of nutrition education”



reported that “participatory community-based nutrition education for caregivers improved child dietary diversity even in a food insecure area”(Kuchenbecker et al., 2017). In the district of Rupandehi in Western Nepal, a cross-sectional study was conducted among mothers with children aged 6-23 months on child feeding practices and reported that minimum meal frequency was relatively high (84%) while dietary diversity (35%) and minimum acceptable diet (33%) were low (Gautam et al., 2016). Again, “maternal education and having had their children’s growth monitored were independently associated with receiving minimum acceptable diet” (Gautam et al., 2016). Maternal education has also been shown in a randomized control trail to have positive association with child dietary diversity. The randomized control trail established that infant and young child feeding practices can be improved among children between “5 and 18months of age” if caregivers are given “2 to 3 month nutrition education program” carried out by “government and community health volunteers as well as local NGOs” (Reinbott & Jordan, 2016). The study recommended “implementing health promotion programs that educate and enhance the skills of mothers” in future nutrition interventions. However, some studies suggest that “counseling on maternal diet and weight gain during is seldom carried out” in community-based health care delivery setting (Kavle & Landry, 2018). Also, a post-program comparison group study was conducted in Uganda to compare feeding practices and caregiver nutrition knowledge among mother and child group who completed a nutrition education program and a comparison group drawn from the community. The study administered a survey on feeding practices and 24-hour dietary recalls to post-program caregivers and children aged 6 to 59 months and a comparison group of caregivers and children. The results of the study indicated that post-program group children had higher dietary diversity scores compared with their counterparts from the community who did not participate in nutrition education. The proportion

of children who met the minimum meal frequency was 44.8% in the post-program group compared to 37.9% in the comparison group, minimum dietary diversity was 10.3% against 3.4% in the comparison group and minimum acceptable diet was 10.3% compared to 3.6% in the comparison group from the community (Ickes et al., 2017).

As a result of the increasing rate at which the “WHO infant and young child feeding indicators are increasingly adopted” (Jones et al., 2014), country-specific analyses of the indicators associations with child growth was performed and the consistency of these relationships across contexts were compared to assess the strengths and potential limitations of the indicators. The study determined cross-country patterns of associations of each of the indicators with child “stunting”, “wasting”, “height-for-age” z-score (HAZ) and “weight-for-height” z-score (WHZ). A total of eight studies using recent “Demographic and Health Surveys data” from a total of nine countries in “sub-Saharan Africa (nine), Asia (three) and the Caribbean (one)” were identified. The findings demonstrated that the WHO “indicators of diet diversity” and overall “diet quality” were positively associated with HAZ in Bangladesh, Ethiopia, India and Zambia (Jones et al., 2014). Based on the evidence presented across the literature, it is clear that the determinants for maternal, “infant and young child feeding indicators” are multifaceted and multi-dimensional. They are interrelated and ranges from individual, group, community or population level factors (Black, 2003; Issaka et al., 2014, 2015; Kamran et al., 2017; Khan et al., 2017; Nankumbi & Muliira, 2015; Oddo & Ickes, 2018; Ruel, 2003; Taruvinga et al., 2013). The discussion in the literature seems inconclusive about the determinants of feeding indicators among children and their mothers. Therefore, continues research into infant and young child feeding practices remain relevant and further understanding is needed about the determinants of feeding practices among mothers and children especially in CHPS zones. This may help improve nutrition health care



services delivery through informed maternal and child nutrition education tailored at addressing specific maternal and child feeding problems in the communities.

## **2.9. Calculation of maternal and child feeding indicator values**

The World Health Organization document entitled “indicators for assessing infant and young child feeding practices” (WHO, 2010) describes the calculation of the indicator values for minimum dietary diversity, minimum meal frequency and minimum acceptable diet as shown next.

### **2.9.1. Calculation of Minimum dietary diversity**

**Definition:** “Proportion of children 6-23 months of age who receive foods from 4 or more food groups”

$$\frac{\text{"Children 6 – 23 months of age who received foods from } \geq 4 \text{ food groups during the previous day"}}{\text{"Children 6 – 23 months of age"}}$$

To calculate a value for this indicator, a 7 food group score variable needs to be created. The 7 foods groups used for calculation of this indicator are:

1. Grains, roots and tubers
2. Legumes and nuts
3. Dairy products (milk, yogurt, cheese)
4. Flesh foods (meat, fish, poultry and liver/organ meats)
5. Eggs
6. Vitamin-A rich fruits and vegetables
7. Other fruits and vegetables





### 2.9.2. Calculation of minimum meal frequency

**Definition:** “Proportion of breastfed and non-breastfed children 6-23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more”.

$$\frac{\text{"Breastfed children 6 – 23 months of age who received solid, semi – solid, or soft foods the minimum number of times or more during the previous day"}}{\text{"Breastfed children 6 – 23 months of age"}}$$

and

$$\frac{\text{"Non – breastfed children 6 – 23 months of age who received solid, semi – solid, or soft foods or milk feeds the minimum number of times or more during the previous day"}}{\text{"Non – breastfed children 6 – 23 months of age"}}$$

### 2.9.3. Calculation of minimum acceptable diet

**Definition:** “Proportion of children 6-23 months of age who receive a minimum acceptable diet (apart from breast milk)”

$$\frac{\text{"Breastfed children 6 – 23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day"}}{\text{"Breastfed children 6 – 23 months of age"}}$$

and

$$\frac{\text{"Non – breastfed children 6 – 23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day"}}{\text{"Non – breastfed children 6 – 23 months of age"}}$$



#### 2.9.4. Calculation of food consumption score

The “Food Consumption Score (FCS)” as an index was developed by the World Food Program (WFP) in 1996 (INDDX, 2018). It is an indicator used by the World Food Program for measuring food insecurity (WFP, 2015). The FCS can be used to define categories of household (HH) food insecurity. The information gathered to develop the FCS also provide additional opportunity which can be used to determine food groups consumed by the households and therefore provide essential information in terms of nutrient rich food groups consumed by the households (WFP, 2015). A brief questionnaire is used to gather the data by asking respondents to recall their “households’ consumption of eight different food groups over the previous seven days” (WFP, 2015; WFP & FAO, 2008). To calculate the FCS, the “consumption frequency of each food group is multiplied by an “assigned weight” that is based on the “relative nutritional value of the consumed food group”. Nutritionally-dense foods such as animal products are given greater weight than the less nutritionally dense foods such as cereals.

**Table 2. 2: Food groups and their weights**

Food groups	Weight	Justification
Main staples	2	“Energy dense, protein content lower and poorer quality (PER less) than legumes, micro-nutrients (bound by phytates)”
Pulses	3	“Energy dense, high amounts of protein but of lower quality (PER less) than meats, micro-nutrients (inhibited by phytates), low fat”
Vegetables	1	“Low energy, low protein, no fat, micro-nutrients”
Fruit	1	“Low energy, low protein, no fat, micro-nutrients”
Meat and fish	4	“Highest quality protein, easily absorbable micro-nutrients (no phytates), energy dense, fat. Even when consumed in small quantities, improvement to the quality of diet are large “
Milk	4	“Highest quality protein, micro-nutrients, vitamin A, energy. However, milk could be consumed only in very small amounts and should then be treated as condiment and therefore re-classification in such cases in needed”
Sugar	0.5	“Empty calories. Usually consumed in small quantities”
Oil	0.5	“Energy dense but usually no other micro-nutrients. Usually consumed in small quantities”

Source: (WFP & FAO, 2008), *PER: Protein Efficiency Ratio*

Those values obtained from the multiplication of the food group consumption frequency by the relative weight of the consumed food group are then summed to obtain the Food Consumption Score (FCS) (WFP & FAO, 2008).

$$\text{FCS} = \text{A.staple} * \text{X.staple} + \text{A.pulse} * \text{X.pulse} + \text{A.veg} * \text{X.veg} + \text{A.fruit} * \text{X.fruit} + \text{A.animal} * \text{X.animal} + \text{A.sugar} * \text{X.sugar} + \text{A.dairy} * \text{X.dairy} + \text{A.oil} * \text{X.oil}$$

Where, FCS= “Food consumption score”

X = “Frequencies of food consumption = number of days for which each food group was consumed during the past 7 days” (7 days is designated as the maximum value of the sum of the frequencies of the different food items belonging to the same food group).

A= “Weight of each food group”

#### Steps:

1. “Group food items in the specified food groups (condiments not included)”
2. “Sum all the consumption frequencies of food items within the same group”
3. “Multiply the value of each food group by its weight (see table)”
4. “Sum the weighted food group scores to obtain FCS”
5. “Determine the households’ food consumption status based on the following thresholds:  
0- 21: Poor, 21.5-35: Borderline, >35: Acceptable”

Based on the food consumption score value, households can then be further classified as having “poor”, “borderline”, or “acceptable” food consumption using the WFP’s recommended cut-offs to the food consumption score based on the following thresholds: “0-21: Poor”, “21.5-35: Borderline”, “>35: Acceptable”.



**Table 2. 3: Food consumption score categories**

Threshold	Profiles	Thresholds with oil and sugar eaten on a daily basis (7 days per week)
0-21	Poor food consumption	0-28
21.5-35	Borderline food consumption	28.5-42
>35	Acceptable food consumption	>42

Source: (WFP & FAO, 2008)

The “food consumption score is a proxy indicator of household caloric availability” (INDDEX, 2018). This indicator is useful for “categorizing and tracking households’ food security across time” and has been validated as a proxy for “caloric sufficiency” (INDDEX, 2018; WFP & FAO, 2008). Since the FCS questionnaire ask respondents to recall the food they consumed in the past seven days, it gathers data about “usual household diet”. The FCS has been shown to be useful in many ways including for “program monitoring and evaluation”, and “population-level targeting” (INDDEX, 2018; WFP & FAO, 2008).

### **2.10. Measures to improve primary health care system and maternal and child nutrition health indicators**

Globally, the evidence regarding strategies and interventions for maternal and child care in community settings has grown substantially with a range of potential interventions which can be packaged and delivered at separate times by community health workers and other cadre during “pregnancy”, “childbirth”, and “after birth” (Bhutta, 2017). Especially, the evidence about effective “community-based interventions” for improving the “health of mothers and children younger than 5 years of age is growing rapidly” and highly substantial (Perry et al., 2017). One of the major focus of policy makers is to implement “innovative strategies” which can improve “coverage of evidence-based interventions” in marginalized communities in order to improve





“child survival, health, and nutrition” (Chopra et al., 2012). Strategies which have been shown to work among others include “task shifting”, “increases in human-resource availability and geographical access”, “expanded roles for lay health workers”, “reduction of financial barriers”, and “use of the private sector” (Chopra et al., 2012). The literature report that these strategies have potential to improve coverage of health interventions which have been shown to be effective at improving health outcomes in children. As part of efforts to improve access to maternal and child nutrition health care services, some countries are developing health systems and infrastructure in the communities where services are delivered and the outcome of these measures put in place by countries have been impressive (Lemma & Matji, 2013). The Government of Ethiopia designed a “scaling-up strategy” in the form of a so-called “health development army” to scale up best practices using families as “role models” (Lemma & Matji, 2013). Marked success in Ethiopia’s national nutrition program and strategy was realized as a result of the community-based nutrition program interventions by the Ethiopian government. Interventions in the community-based nutrition program included “infant and young child nutrition”, and “growth monitoring and promotion”. The effort of the “community-based nutrition” program “resulted in more than 50% of children in Ethiopia being exclusively breastfed” (EDHS, 2011). For “equitable access of all vulnerable women and children to both curative and preventive services”, the role of “health extension workers’ cannot be over emphasized (MOH, 2014). A recent study conducted in Ghana revealed that, “gaining a source of income, receiving money from the government, provision of accessible drinking water, increasing rationing quantity, constant reminders from husbands and household members and help with means of transport” are ways to improve nutrition programs interventions (Yeboah & Kissiwah, 2017). Robust evidence from Bangladesh revealed that application of “community-

based approaches”, especially investing in “community health workers” to use “doorstep delivery approach” and “rapid adoption of context-specific innovative technologies and policies” improve “equitable access of all vulnerable women and children to both curative and preventive services” (El Arifeen et al., 2013).

Systematic reviews of randomized controlled trials repeatedly report statistically significant effects of major categories of maternal and child health interventions which include nutritional interventions and holistic primary health care. The findings reported from a systematic review demonstrate important evidence that by supporting “community-level workers” and “engaging communities”, major causes of mortalities among children in poor settings can be addressed at the community level (Freeman et al., 2017). Some of the effective interventions reported for child health at the community level include; “promotion of breastfeeding and complementary feeding”; “supplementation with vitamin A and zinc”; “immunizations”; “co-trimoxazole for HIV-positive children”; “education on the safe disposal of feces and hand washing”; distribution and “promotion of insecticide-treated bed nets (ITNs) or indoor residual spraying (IRS) or both”; “detection and treatment or referral of children with severe acute undernutrition”; and “detection and treatment of pneumonia”, “malaria and diarrhea without danger signs” and “referral if danger signs appear” (Freeman et al., 2017; Lassi et al, 2016). Other studies present similar report on effective child health interventions to include “promotion or provision of immunizations”; “promotion of healthy household behaviors and appropriate utilization of health services” (Perry et al., 2017). The effective strategies reported for delivering interventions for mothers, infants and young children include; “house-to-house visitation by community health workers (CHWs)”; “community case management of childhood illness”; “use of participatory women’s groups”; and “outreach services provided in the community by mobile teams based at





peripheral health centers” (Freeman et al., 2017; Lassi et al, 2016). “It has been estimated that scaling up these interventions with an essential package of community-based interventions would avert 1.5 million deaths of children 1-59 months each year” (Black et al, 2016). Systematic review of both randomized and non-randomized controlled studies in nutrition report significant statistical findings which show that undernutrition can be successfully addressed in the community with CHWs visiting households regularly to provide health and nutrition education; regular child growth monitoring in the community; and ready-to-use therapeutic food (RUTF) supplementation (Freeman et al., 2017).

Some effective maternal interventions established concern “promotion and/or provision of antenatal care”(Perry et al., 2017). Other studies suggest that “maternal nutrition education should be a strong component of antenatal and postnatal care” and should “emphasize the use of fortified staples, animal-source foods, dietary diversification and the use of supplements to improve the quality of diet” (Lartey, 2008). This may ensure that women who report early for antenatal care and are regular with the attendance would gain full benefits from micronutrient supplements and other important health and nutrition interventions. Though community-based strategy can be effective in promoting optimal maternal and child health and nutrition in the communities (Bhutta, 2010), coverage levels of “evidence-based maternal and child health (MCH) interventions in the population “remains around 50% or less” except for “immunizations and vitamin A supplementation” (Bhutta, 2013).

## CHAPTER THREE

### METHODOLOGY

#### 3.0. Introduction

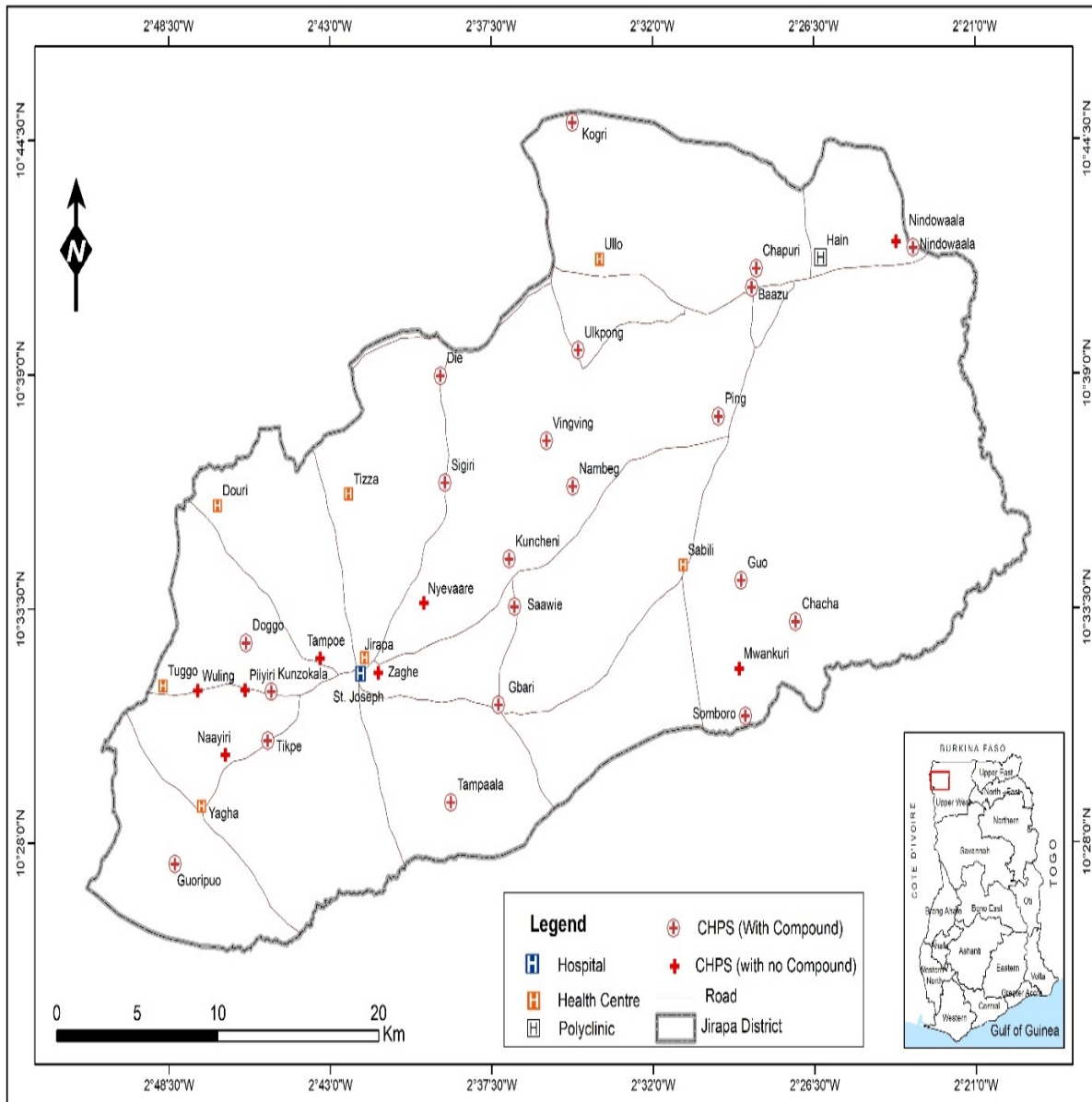
This chapter presents the methodology employed in carrying out the study. The chapter provides profile of the study area, the type of study, study design, target population, sampling technique, sample size, data collection methods, data collection tools, data analysis and presentation and ethical considerations used in the study.

#### 3.1. Profile of the study area

**3.1.1. Location and Size:** The Jirapa municipality is located in the north western part of the upper west region of Ghana. It shares borders with the following districts; Nadowli-Kaleo to the south, Lambussie to the north, Lawra to the west and Sissala west to the east. The municipality covers about 13.1% of the region's population (MHA, 2019). It is made up of two traditional areas; the Jirapa paramountcy and the Ullo paramountcy. The Dagaabas are the dominating tribe with a few Sissalas and other tribes in the municipal. The Municipality is made up of one hundred and thirty-seven (137) communities of varying sizes (MHA, 2019). There are two communities that share borders with Burkina Faso which makes surveillance activities difficult. Also, fifteen communities are hard to reach during the rainy reasons (MHA, 2019).







Source: Adopted and modified from the Jirapa Municipal Health Administration, 2019

**Figure 3. 1. Map of the study area**

**3.1.2. Climate and vegetation:** The municipality is “within the Guinea Savanna climatic Zone” and experiences “one season of rainfall and a long dry spell” (MHA, 2019). The “rainy season starts from June to October” giving way to the “dry season from November to May” (MHA,

2019). The rainfall distribution varies from year to year sometimes with “intermittent droughts and floods mostly peaking in September” (MHA, 2019). The occurrence of droughts and floods affect the growth of crops, thus resulting in reduced crop yields every year. Temperature ranges from 18° C in the wet season to 40° C in the dry season (MHA, 2019). During this period of extreme warm weather, “deaths caused by outbreak of meningitis and other diseases are likely in the municipality” (MHA, 2019).

**3.1.3. Soil:** The soil of the municipality is mainly “sandy loam with underlying hard iron pans” (MHA, 2019). However, there are narrow strips of alluvial soils along the numerous dry valleys of the tributaries of the Black Volta river suitable for rice farming (MHA, 2019). The sandy loam is “susceptible to severe sheet and gully erosion caused by surface run-off during the peak of the wet season” (MHA, 2019). The wide spread erosion adversely affects not only fertility of the soil but also causes silting of the few small-scale dams and dugouts in the municipality. Generally, the sandy loam is very fertile and enhances large-scale cultivation of groundnuts and cowpea.

**3.1.4. Population size, growth rate:** The projected population for 2019 from the 2010 population census is 104720 with a growth rate of 1.9.



**Table 3. 1: Target populations for 2019**

Sub-Municipals	Total Population	Male	Female	0-11 months	0-59 months	WIFA	Expected Pregnancy
Duori	8,443	3,968	4,475	338	1,689	2,026	338
Hain	12,897	6,061	6,835	516	2,579	3,095	516
Jirapa	34,921	16,413	18,508	1,397	6,984	8,381	1397
Sabuli	8,503	3,996	4,507	340	1,701	2,041	340
Tizza	8,188	3,848	4,339	328	1,638	1,965	328
Tuggo	10,031	4,715	5,316	401	2,006	2,407	401
Ullo	11,230	5,278	5,952	449	2,246	2,695	449
Yagha	10,508	4,939	5,569	420	2,102	2,522	420
Municipal Health Directorate	104,720	49,219	55,502	4,189	20,944	25,133	4189

Source: Jirapa MHA, 2019

**3.1.5. Religion:** Christians dominate the population in the municipality. They constitute about 90% of the population (MHA, 2019). The Christian denominations in the municipality include the Catholics, Pentecost, Deeper Life, Assemblies of God, Jehovah’s Witnesses, Seventh Day Adventist and Presbyterian Church, but the majority are Catholics. The rest of the people practice traditional religion and Islam.

**3.1.6. Major economic activities:** Agriculture remains the major economic activity in the municipality. About “90% of the people are engaged in crops and animal farming” (MHA, 2019). The agriculture practice is subsistence in nature with few instances of large scale farming in Hain and Mwankuri areas. “Cereals, legumes, tubers and vegetables are the main crops” cultivated in the municipality (MHA, 2019). Cash crops cultivated are cotton and groundnut. Other trees of economic importance include sheanut and dawadawa. Cattle, sheep, goats, pigs, dogs, and poultry are the main types of animals that have been indigenous to the municipality.



**3.1.7. Health infrastructure:** The municipality has forty-four (45) health facilities; seven (7) health centres, thirty-six (36) CHPS zones out of which 22 are CHPS with compounds and the rest are mobile CHPS (CHPS without compounds), one polyclinic and a hospital. Out of the 45 health facilities, three health centres and the hospital are managed by Christian Health Association of Ghana (CHAG).

**Table 3. 2: Type and location of health facilities**

Type of facility	No.	Location	Remarks
CHAG (Agency Hospital)	1	Jirapa Town	Serves as the referral hospital for all the health centers
Government health Centres	4	Duori, Jirapa, Tuggo and Tizza	
CHAG Facilities	3	Yagha, Ullo and Sabuli	
Community- based Health Planning and Services(CHPS) with compounds	22	Saawie, Tampaala, Ping, Kogri, Gbare, Nambeg, Somboro, Sigri, Guoripuo, Tamapuo, Ulkpong, Kuncheni, Degri, Chapuri, Die, Nindorwala, Uollo/Ulkuu, Tie/Tikpe, Doggo/Konzokala, Vingving, Guo/Chacha and Zingpuroyiri	
Community- based Health Planning and Services(CHPS) <b>without</b> compounds	14	Nindowaala, Kokuo, Danaayiri/JSEC, Piiyiri, Siiri, Zaghe , Naayiri, Baazu, Ververi, Tampoe, Nyene/Nyevaare, Mwankuri, Baguu CHPS and Wulling	
Polyclinic	1	Hain	

Source: Jirapa MHA, 2019



**Table 3. 3: Community based structures/ workers**

No. of communities	137
No. of outreach points	786
No. CBAs	275
Community Based Surveillance Volunteers	137
Herbalist/Traditional Healers	43
Chemical sellers	11

Source: Jirapa MHA, 2019

### 3.2.Type of study

The study was a mixed method study. Mixed methods study is a study where both quantitative and qualitative data are combined. The use of this method seems to be popular in the health field. As research methodology continue to develop, mixed methods maybe another step forward, “utilizing the strengths of both qualitative and quantitative research” (Creswell, 2009). In view of the research problem for this study, the use of both quantitative and qualitative approaches was more appropriate compared to the use of either of them. In assessing maternal and child nutrition health promotion in CHPS zones, there is more insight to be gained by the use of mixed method research than the use of quantitative or qualitative methods only. “Their combined use provides an expanded understanding of the research problem” (Creswell, 2009). A recent report from systematic review of mixed methods research recommended that researchers who investigate “health care quality problems” should “expand their use of mixed methods research” (Ridde & Sardan, 2015). Since this approach “utilizes the strengths of both qualitative and quantitative methods”, it allows for “both inductive exploration and deductive investigation” which helps to widen understanding by the use of one approach to “better understand, explain, or build on the results from the other approach” (Creswell, 2009).



### **3.3. Study design**

The study was a descriptive cross-sectional survey. It has been reported that cross-sectional studies are “an inexpensive first step in the process of identifying health problems and collecting information of possible risk factors” (Peat, 2001). This study assessed CHPS performance in maternal and child nutrition health care services delivery in CHPS zones. As such the use of cross-sectional study design provided a “useful snap-shot of what is happening” in the CHPS zones in a “single study sample at one point in time”. Both the “exposures of interest and the outcomes were measured at the same time” and it is “not possible to determine whether the exposure and the outcome are causally related” (Julie A Lovegrove, Leanne Hodson, 2015). The main objective of cross-sectional studies is to estimate “the level of a set of variables in a defined population” (Lemeshow, 1999). The study therefore estimated CHPS performance in maternal and child nutrition health care services delivery and their contribution to maternal and child nutrition outcomes in CHPS zones in Jirapa municipality.

### **3.4. Target population**

The target population for the study was CHPS compounds and mothers with children under five years of age registered at CHPS compounds and accessing maternal and child health care services from the CHPS facilities within Jirapa municipality. The target population is “the entire set of individuals to which findings of the survey are extrapolated” (Lemeshow, 1999). “The individual members of the population whose characteristics are measured are called elementary units or elements of the population” (Lemeshow, 1999). The study elements were CHPS compounds and mothers of children under five years of age registered under the CHPS zones within Jirapa municipality.



### **3.5.Sampling technique**

#### **3.5.1. Purposive sampling**

Purposive sampling technique was employed to obtain data for the qualitative study. The Nutrition officer at the municipal health administration and 11 community health officers (CHOs) in-charge of CHPS compounds were purposively sampled for in-depth interviews as key informants. In purposive sampling, “individuals are selected who are considered to be most representative of the population as a whole” (Lemeshow, 1999). Purposive sampling technique is useful to describe a program, or participant that serves as a profile for understanding the principal features of a group of programs or a class of individuals (Ulin & Robinson, 2005). Sample that is obtained through purposive sampling technique is considered typical of the population. Though what constitutes typical is a subjective judgment, key informants who are especially familiar with the general category likely identify examples that are average, not extreme in any sense related to the study (Ulin & Robinson, 2005). These constituted the bases for the choice of purposive sampling technique. Purposive sampling technique was employed to obtain study participants for the in-depth interviews which was conducted with CHPS community health officers and staff of the municipal health administration as key informants.

#### **3.5.2. Institutional census**

The study was a census of all CHPS compounds in the Jirapa municipality to assess CHPS performance in maternal and child nutrition health care services delivery in CHPS zones in the municipality. “When all the individuals in the population are selected for measurement, the study is called a census” (Lemeshow, 1999). The investigator chose this option because the “summary statistics obtained from a census are not extrapolations since every member of the population is measured” (Lemeshow, 1999). “The validity of the resulting statistics, however, depends on how

well the measurements are made” (Lemeshow, 1999). The In-charges of each CHPS compound was invited to lead in answering the survey for the CHPS compound. Since the study is a cross-sectional study, in CHPS compound where the in-charge was not met at the time of the survey, the staff available at the time of visit was interviewed and there was no revisit to the CHPS compound.

### **3.5.3. Convenience sampling**

Convenience sampling was used in the study. It is a type of nonprobability sampling which involves the sample being drawn from that part of the population which is close to hand, that is readily available and convenient (Lemeshow, 1999). Sample surveys can be categorized into probability samples and nonprobability samples on the basis of how the sample was selected (Lemeshow, 1999). The major characteristic of a probability sample is that every element in the population has a known, nonzero probability of being included in the sample while a nonprobability sample is one based on a sampling plan that does not have this feature (Lemeshow, 1999). In probability sampling, because every element has a known chance of being selected, unbiased estimates of population parameters that are linear functions of the observations (e.g., population means, totals, proportions) can be constructed from the sample data. On the other hand, in nonprobability sampling, the user has no firm method of evaluating either the reliability or the validity of the resulting estimates. Nevertheless, nonprobability samples are used quite frequently, especially in surveys (Lemeshow, 1999). This sampling technique was used in the study because probability sampling is an expensive procedure and, in fact, may not be feasible in some situations (Lemeshow, 1999).

In the study, any mother registered for child welfare clinic (CWC) at the CHPS compound who came for CWC at the time of the survey and consented to respond to the questionnaire was





included in the survey. The questionnaires were administered to the mothers according to the order in which they came to the CHPS compound until the required sample size was obtained. At least, fifteen (15) mothers were interviewed in each of the selected CHPS zones. For mothers with children 2-4 years who would not visit the facility for child welfare clinic, their details/home addresses were randomly sampled from the CHPS compound's records and traced to the community. The variables or characteristics of interest were then measured on each of the sampled mothers.

### 3.6. Sample size determination

The study conducted twelve (12) in-depth interviews for the qualitative data. It has been reported that “regardless of the design chosen, one can typically begin with approximately five interviews, increasing the sample size until saturation is reached, the point at which no new information is being revealed through additional interviews” (Bentley et al., 2014). Ten in-depth interviews were enough to reach saturation in the study.

The minimum sample size for collecting the quantitative data from mothers was obtained using the Snedecor and Cochran's sample size formula for categorical data.

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

The acceptable margin of error was 5% at 95% confidence level. Based on this, the minimum sample size for the study was determined as follows;

Where n = required sample size,

t = the z-score associated with 95% confidence level (standard value of 1.96)

p = estimated proportion of the attribute present in the population, 35% (value of 0.35).

The study assumed that the estimated proportion of children aged 6-23 months in CHPS zones who do not meet the World Health Organization recommended standards for child feeding practices is 35% (0.35)

m = margin of error (required precision) at 5% (standard value of 0.05)

Based on the stated parameters, the minimum required sample size for the study was calculated as three hundred and fifty (350) mothers. 
$$n = \frac{(1.96)^2 \times (0.35)(0.65)}{(0.05)^2} = 350 \text{ mothers}$$

### **3.7.Data collection methods**

#### **3.7.1. In-depth interviews**

The researcher used in-depth interviews (twelve in-depth interviews) method to collect data for the qualitative study. The “common interviewing techniques include in-depth interviews and semi-structured interviews” (Bentley et al., 2014). The “principal difference between the two is the conversational nature of the interview” (Bentley et al., 2014). For in-depth interviews, the “interviewer has high discretion in choosing the sequence of topics and/or wording of the questions”. In contrast, “semi-structured interviews” “are more standardized, with the interviewer following closely the wording and sequencing” of a predetermined set of “open-ended questions” (Bentley et al., 2014). The choice of “semi-structured interviews provide a tool for focused qualitative research when a good understanding of the phenomena to be explored already exists” (Bentley et al., 2014). Since the investigator sort to explore measures which can potentially improve maternal and child nutrition health care delivery activities in CHPS zones, the use of in-depth interviews was more appropriate as it allowed the investigator to exercise high discretion in choosing the sequence of topics and/or wording of the questions.



### 3.7.2. Administering questionnaire

The investigator employed questionnaire administration to collect data for the quantitative study. Questionnaires may be “self-administered, that is completed by the subject, or researcher administered, that is the questions are asked and the questionnaire filled in by the researcher” (Peat, 2001). The researcher together with other trained data collectors (enrolled nurses, community health nurses and technical officers; nutrition, disease control and field technicians) in quantitative studies administered the questionnaires face-to-face. Face-to-face interview was used because, “it is very easy for a designated respondent to refuse to complete a questionnaire sent by mail, since the respondent has no direct contact with the researcher conducting the survey” (Lemeshow, 1999). It is “somewhat more difficult for the respondent to refuse a telephone interview”, since there is voice contact, and it is “most difficult for the respondent to refuse a face-to-face interview”, since there is “eye-to-eye” contact between respondent and interviewer (Lemeshow, 1999). This largely informed the choice of the researcher in this study to administer the questionnaire using “face-to-face interview”. In “face-to-face” surveys, “the nonresponse rates can often be reduced if an effective publicity campaign is initiated in advance of the survey” (Lemeshow, 1999). The researcher had prior communication with all community health officers in-charge of CHPS compounds before the date of questionnaire administration. The response rate to “self-administered questionnaires may be low and the use of these types of questionnaires does not allow for opportunities to clarify responses”. On the other hand, “interviewer-administered questionnaires”, which can be face-to-face have the advantage of being able to collect more complex information and of being able to minimize missing data” (Peat, 2001).



### **3.8.Data collection tools**

#### **3.8.1. In-depth interview guide**

In-depth interview guide was the main data collection tool used in the in-depth interview. Interviews are “usually based on an interview guide containing a bulleted list of topics or a set of research questions” (Bentley et al., 2014). In any case, interviews are typically audio-recorded for subsequent transcription and analysis” (Bentley et al., 2014). In this study, the researcher audio recorded the indepth interviews using itel prime 4 tablet.

#### **3.8.2. Structured questionnaire**

Structured questionnaire was the data collection tool in the questionnaire administration. The choice of questionnaire by the investigator was informed by the fact that in cross-sectional studies, exposure and outcome status are “often collected by questionnaires that ask for current or retrospective information” (Peat, 2001). Two sets of questionnaires were used in the study, one set for CHPS compounds and the other set for mothers. The questionnaire for the CHPS compounds assessed maternal and child nutrition health care services delivery in CHPS zones while the questionnaire for the mothers assessed maternal and child nutrition outcomes with focus on household food consumption score, minimum dietary diversity, minimum meal frequency and minimum acceptable diet. The questionnaires were developed based on detailed review of the empirical and theoretical literature on maternal and child nutrition health care services delivery and maternal and child nutrition feeding indicators. The questionnaires were designed in English as all community health officers at the CHPS zones can read, write and speak English. For non-literate respondent mothers, the questionnaire was interpreted into the local language for them. The researcher used questionnaire because they are simple and cheap to administer and can be used to collect information about past as well as present” (Peat, 2001). The



“inherent disadvantage with questionnaires is that they only provide subjective information, but this is balanced by the advantage that they are a cheap and efficient method of collecting information that is relevant to the subject” (Peat, 2001).

### 3.9. Study variables

#### 3.9.1. Dependent variables:

**Household food consumption score:** This indicator was calculated based on the Interagency Workshop Report of WFP -FAO on construction of the FCS (WFP & FAO, 2008)

**Minimum dietary diversity:** This indicator was assessed based on the standard of the World Health Organization document entitled “indicators for assessing infant and young child feeding practices” (WHO, 2010).

**Minimum acceptable diet:** This indicator was assessed based on the standard of the World Health Organization document entitled “indicators for assessing infant and young child feeding practices” (WHO, 2010).

#### 3.9.2. Independent variable (s):

The main independent variable is CHPS performance: CHPS performance was measured using 5 key indicators namely; training/capacity-building for CHPS health staff, availability of protocols/working guideline, the stock of essential maternal and child health medicines, availability of logistics and availability of nutrition services.

Each of these indicators were aggregated as composite indicator for each CHPS zone. The composite indicator was further categorized as adequate (coded 1) and inadequate (coded 0) using the 50<sup>th</sup> percent mark of the composite score. The five (5) indicators were then interacted to determine CHPS overall performance in relation to maternal and child nutrition healthcare. After interacting the indices, high-performing CHPS came out with a code of 1 and low-performing CHPS had a code of 0.



**3.9.3. Explanatory variables:**

- Education level of mother
- Number of living children of mother
- Ethnicity
- Age of child
- Sex of child
- Age of mother
- Occupation of mother
- Nutrition counseling during child welfare clinic
- Nutrition counseling during ANC visit
- Maternal nutrition related knowledge
- Household decision maker regarding food purchases
- Dietary advice from family members regarding maternal and child feeding
- Cultural values or believes forbidding mothers from eating certain foods
- Cultural values or believes forbidding children from eating certain foods



### 3.10. Data analysis and presentation

#### 3.10.1. Qualitative data analysis

The qualitative data was analyzed using inductive thematic analysis approach.

*“Thematic analysis involves the “searching across a data set, be that a number of interviews or focus groups, or a range of texts to find repeated patterns of meaning. The exact form and product of thematic analysis varies. There are no hard-and-fast rules in relation to this, and different combinations are possible. What is important is that the finished product contains an account-not necessarily that detailed-of what was done, and why”(Braun, V. and Clarke, 2006: 15).*

The qualitative data analysis followed six (6) main phases.

Phase 1 was on familiarizing with the data. The audio recorded interviews from the study respondents were repeatedly played and listened for meanings and patterns in the data set. As the audio data was played and listened, the meanings and patterns in the data set were noted down to develop potential coding schemes. Also in the phase 1 of the data analysis, the audio recorded data was transcribed verbatim into written form for subsequent thematic analysis. The transcripts were repeatedly read which helped to develop a far more thorough understanding of the data set.

Phase 2 of the qualitative data analysis was on generating initial codes for the data. The coding was done manually. The coding was done to identify features of the data such as logistics, monitoring, training, finance, education, home-visits, motivation that appear interesting to the study and can be assessed in a meaningful way regarding the study. Phase 3 began when all the data had been coded and collated with a long list of 113 different codes identified across the data set. In phase 3, themes were searched from the codes generated in phase 2. This involved sorting the different codes into potential themes while considering how different codes may combine to



form a dominant theme. At this stage, the relationships between codes, between themes and between different levels of themes were considered. Phase 4 focused on reviewing themes generated in the phase 3. This phase began when all the set of candidate themes were devised. Again at this phase, the entire data set was re-read to validate the themes in relation to the data set and to code any additional data within themes that were missed in the earlier coding stages. Phase 5 then followed with defining and naming of the themes in phase 4. At this point, the themes were then defined and further refined. Phase 6 focused on producing the qualitative report. This phase started after a set of fully worked-out themes were obtained. The qualitative report is presented in chapter four under strategies to strengthen CHPS healthcare services delivery.

### **Quantitative data analysis**

Statistical Package for Social Sciences (SPSS) version 22 was used to analyse the quantitative data. Bivariate tests were used to examine association between categorical exposure variables and the dependent variables. All statistically significant exposure variables from the bivariate tests were used in multinomial logistic regression analysis to examine the determinants of household food consumption while binary logistic regression analysis was used to examine the determinants of minimum dietary diversity, minimum meal frequency and minimum acceptable diet of children. The results are presented in tables and charts for easy description and interpretation.

### **3.11. Validity and reliability of data collection tools**

The reliability of population estimate “refers to how reproducible the estimator is over repetitions of the process yielding the estimator” (Lemeshow, 1999: 38). The validity of a population estimate refers to “how the mean of the estimator over repetitions of the process



yielding the estimate, differs from the true value of the parameter being estimated” (Lemeshow, 1999: 38). An important concept of validity is that it is an estimate of the accuracy of a test in measuring what we want it to measure (Lemeshow, 1999; Peat, 2001). The researcher pretested the data collection tools with the objective of “eliminating any discernible imperfections in the survey procedures” (Lemeshow, 1999).

### **3.12. Ethical consideration**

The researcher obtained approval from the Scientific Review Committee of the Kintampo Health Research Centre. Subsequently ethical approval was obtained from the Kintampo Health Research Centre’s Institutional Ethics Committee. The “response rate in surveys might be increased if the survey is endorsed by an official agency or organization whose sphere of interest includes the subject matter of the survey” (Lemeshow, 1999: 397). Endorsement by an appropriate agency is “especially important in surveys of institutions” (Lemeshow, 1999) as with the study of CHPS. Hence, permission was obtained from the Municipal Director of health services. Informed consent was also obtained from each participant before data was gathered. All participants gave verbal consents. To guarantee confidentiality, the researcher did not include questions on personal identification. Participants were assured of confidentiality of whatever information they provided. Participants were at liberty to not answer questions if they didn’t want to and to withdraw from the study at any point in time without suffering any consequences. Participants were informed that they will not directly benefit from the study, however, they were assured that the information they share will support new knowledge on program design and implementation to improve maternal and child health. The participants were also informed that they will not be paid for participating in the study and will not suffer any harm for participating.



Minor participants were not recruited in situations where a Legal Authorized Representative could not be found. All data collectors were trained to assist the researcher in the data collection.

## CHAPTER FOUR

### RESULTS

#### 4.0. Introduction

This chapter presents the results obtained from analyzing the study data. The results consist of socio-demographic characteristics of the study respondents, performance of CHPS zones in relation to maternal and child nutrition healthcare services delivery, prevalence of maternal and child feeding indicators in CHPS zones, factors associated with maternal and child feeding indicators and strategies to strengthen healthcare services delivery for improved maternal and child nutrition health promotion activities in CHPS zones.

CHPS performance in relation to maternal and child nutrition was measured using five (5) key indicators namely; training/capacity-building for CHPS health staff, availability of protocols/working guidelines, availability of essential maternal and child health medicines, availability of logistics and availability of nutrition services.

The indicators used to assess maternal and child feeding were household food consumption score (FCS), minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD). Household FCS was used as a proxy indicator for assessing maternal feeding while MDD, MMF, and MAD were the main indicators for assessing child feeding.

The main dependent variables were household food consumption score, minimum dietary diversity and minimum acceptable diet while the main independent variable was performance of



CHPS on maternal and child nutrition healthcare. All other variables were considered as explanatory variables.

#### **4.1. Socio-demographic characteristics of respondents**

Three hundred and fifty (350) women with children less than five years of age were interviewed. Of the total interviewed (table 4.1), 315 (90.0%) belonged to the Dagaare ethnic group. Of the 350 respondents interviewed, nearly half (46.6 percent) did not have formal education and 6.0 percent had attained up to the tertiary level of education. Also, 230 representing a majority of 65.7 percent of all the women interviewed were peasant farmers. The mean age of the respondents was 27.89 years (standard deviation of 6.501 years). Almost half (49.4%) of the respondents were between the ages of 26 years and 35 years. The modal age group was within the range of less than or equal to 25 years (37.4%). Additionally, a little more than half of the respondents 186 (53.1%) had two or lesser number of living children and only 7 percent had 6 or more living children at the time of the study. Younger children below 6 months were fewer, 14.9 percent relative to their older cohorts. The mean age of the children was 18.39 months (standard deviation of 12.926 months). The modal age range of the children was between 12 months and 23 months. The female children of the mothers interviewed were about 59 percent whereas their male counterparts were about 41 percent.

The study considered whether the respondents were registered unto the national health insurance scheme, and all 350 mothers reported owning a national health insurance card. At the time of this study all the 350 mothers interviewed responded that they had received nutrition counselling during ANC services. In relation to household decision making regarding food purchases, the study found a little less than half (48.9%) of the respondents mentioned that the partner or any other male in her household was responsible for such a decision. Meanwhile, only about 8



percent mentioned that it was the mother or caregiver in the household who make decision on purchasing food for the household. Furthermore, a little more than half (56.3%) of the mothers mentioned that they receive and use dietary advice from family members on issues of maternal and child feeding. About three quarters (75.1%) of the total number of respondents interviewed said there was no presence of cultural values or believes prohibiting women from the consumption of certain food or food items in their locality. Then in a similar fashion, about 78 percent of the mother again said there were no presence of cultural value or believes that prevents children from consuming certain foods or food items in their locality.

**Table 4. 1: Socio-demographic characteristics of study participants**

<b>Variable</b>	<b>Number</b>	<b>Percentages</b>
<b><i>Ethnicity of mothers</i></b>		
	<b>n = 350</b>	
Dagaare	315	90.0
Waala	16	4.6
Sissala	17	4.9
Birifo	2	.6
<b><i>Educational level of mothers</i></b>		
	<b>n = 350</b>	
None	163	46.6
Primary school / JHS	132	37.7
Secondary school	34	9.7
Tertiary	21	6.0





Variable	Number	Percentages
<b><i>Occupation of respondents</i></b>		<b>n = 350</b>
Petty trader	55	15.7
Peasant farmer	230	65.7
Office worker	10	2.9
Charcoal burner	10	2.9
Education	25	7.1
Healthcare	5	1.4
Other	15	4.3
<b><i>Age of mothers (years)</i></b>		<b>n = 350</b>
<=25	131	37.4
26 – 35	173	49.4
36+	46	13.1
<b><i>Number of living children of mothers</i></b>		<b>n = 350</b>
<= 2	186	53.1
3 – 5	137	39.1
6+	27	7.7
<b><i>Age of child (months)</i></b>		<b>n = 350</b>
<6	52	14.9
6 – 11	75	21.4
12 – 23	103	29.4



Variable	Number	Percentages
<b><i>Sex of child</i></b>	<b>n = 350</b>	
Male	145	41.4
Female	205	58.6
<b><i>Have a health insurance card</i></b>	<b>n = 350</b>	
Yes	350	100.0
No	0	0.0
<b><i>Received nutrition counselling during ANC visit</i></b>	<b>n = 350</b>	
Yes	350	100.0
No	0	0.0
<b><i>Household decisions maker(s) regarding food purchases</i></b>	<b>n = 350</b>	
Mother / caregiver	29	8.3
Husband/partner or another man in the household	171	48.9
Mother/caregiver and father together	80	22.9
The elder person in household/family	56	16.0
Mother/caregiver together with the elder person	14	4.0
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>	<b>n = 350</b>	
Yes	197	56.3
No	153	43.7

Variable	Number	Percentages
<b><i>Presence of cultural values or believes forbid mothers from eating certain foods</i></b>		
	<b>n = 350</b>	
Yes	87	24.9
No	263	75.1
<b><i>Presence of cultural values or believes forbid children from eating certain foods</i></b>		
	<b>n = 350</b>	
Yes	77	22.0
No	273	78.0
<i>Age of Mothers (years) (mean and SD, mode)</i>	27.89 ± 6.501, 20	
<i>Age of child (months) (mean and SD, mode)</i>	18.39 ± 12.926, 24	

Source: Field Survey, April 2019

#### **4.2. CHPS performance in relation to maternal and child nutrition healthcare services delivery**

CHPS performance in relation to maternal and child nutrition was measured using five (5) key indicators namely; training/capacity-building for CHPS health staff, availability of protocols/working guidelines, availability of essential maternal and child health medicines, availability of logistics and availability of nutrition services. Each of these indicators were aggregated as composite indicator for each CHPS zone. The composite indicator was further categorized as adequate (coded 1) and inadequate (coded 0) using the 50<sup>th</sup> percent mark of the composite score. The five (5) indicators were then interacted to determine CHPS overall performance in relation to maternal and child nutrition healthcare. After interacting the indices,



high-performing CHPS came out with a code of 1 and low-performing CHPS had a code of 0. A bar chart (figure 4.1) was then generated to illustrate CHPS performance index in relation to maternal and child nutrition health care services delivery.

#### **4.2.1. Performance index of CHPS**

The findings (figure 4.1) of the study revealed that out of a total of 22 CHPS compounds, about a quarter (27.3%) did not have adequate capacity building for the health staff in them. Meanwhile, almost a third of the CHPS compounds had staff with adequate training to provide maternal and child nutrition healthcare services.

In terms of availability and use of recommended protocols and or working guidelines, the researcher noticed a little more than half (54.6 %) of the 22 CHPS compounds had working guidelines/protocols for maternal and child nutrition related healthcare services delivery and the remaining CHPS compounds did not.

On the issue of availability of essential medicines for healthcare service delivery in relation to maternal and child nutrition healthcare, the findings again from the 22 CHPS compounds showed that, 54.6 percent of the CHPS compounds had selected essential medicines in stock and the remaining did not have in stock selected essential maternal and child health medicines.

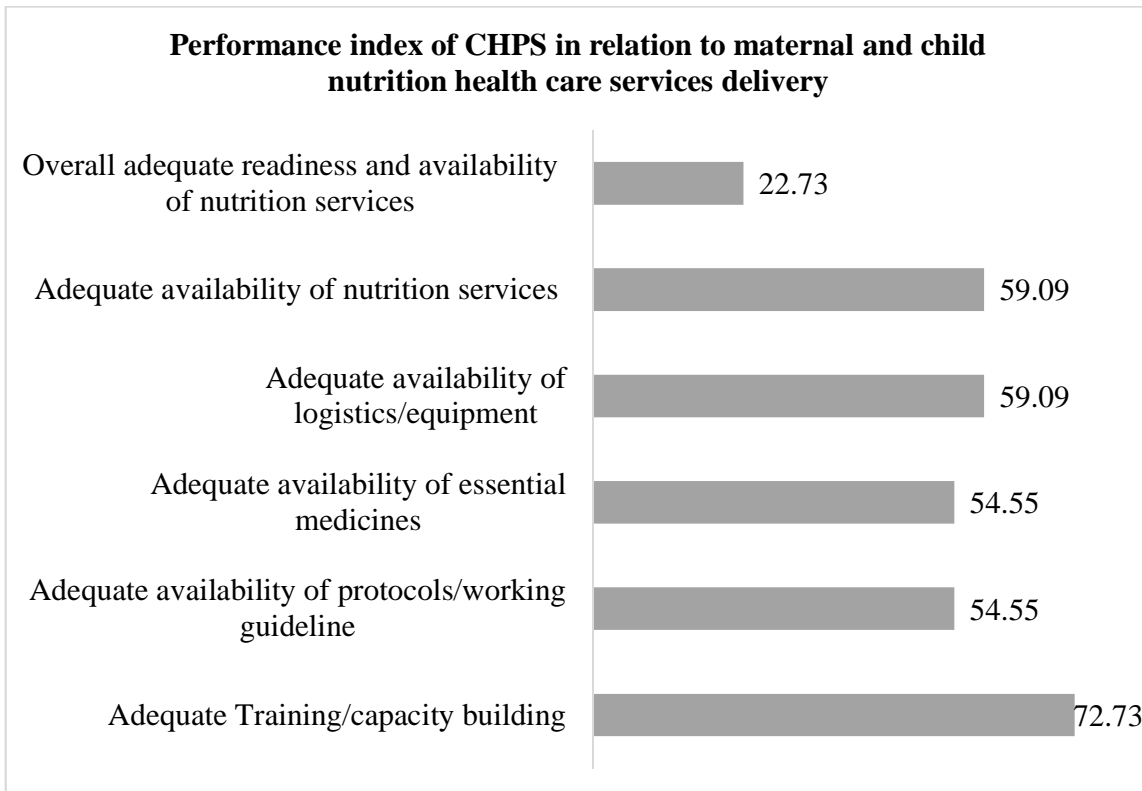
Another revelation from the study showed that logistics/equipment availability in more than half (59.1%) of the 22 CHPS compounds were inadequate while the remaining 41 percent had adequate available logistics/equipment.

The study found that 59.1% of the CHPS compounds provide adequate maternal and child nutrition services to their clients whereas 40.9 percent did not provide adequate nutrition services.





Overall, all the 22 CHPS compounds were categorized as either low-performing or high-performing CHPS facilities in relation to maternal and child nutrition. The researcher again noticed that, of the 22 CHPS compounds, less than a quarter (23%) were high-performing CHPS compounds while 77 percent of them were low-performing CHPS compounds in relation to maternal and child nutrition.



Source: Field Survey, April 2019

**Figure 4. 1: Performance index of CHPS**





#### 4.2.2. Maternal and child nutrition healthcare services in CHPS zones

The study examined maternal and child nutrition healthcare services in CHPS zones in relation to nutrition services provided to pregnant women during ANC visits, provision of nutrition related services as part of prevention of mother-to-child transmission (PMTCT), provision of nutrition related services at delivery, provision of nutrition related services to children, and strategies CHPS health staff use to deliver nutrition interventions.

##### 4.2.2.1. CHPS compounds providing nutrition services to pregnant women during ANC

In respect of nutrition services during antenatal visits, the results (table 4.2) show that all the CHPS facilities (100%) provided folic acid supplementation, nutrition education and counseling for pregnant women, infant and young child feeding education and intermittent preventive treatment in pregnancy at ANC visit.

**Table 4. 2: CHPS compounds providing nutrition services to pregnant women during ANC**

Nutrition service to pregnant women during ANC	Number	Percentage
Iron supplementation	21	95.5%
Folic acid supplementation	22	100.0%
Intermittent preventive treatment in pregnancy (IPTp) for malaria	22	100.0%
Nutritional education and counseling for pregnancy	22	100.0%
Infant and young child feeding education	22	100.0%
Haemoglobin testing	4	18.2%

Source: Field Survey, April 2019

#### 4.2.2.2. CHPS compounds providing nutrition related services as part of PMTCT

With regards to practices for the prevention of mother-to-child transmission (PMTCT) of human immunodeficiency virus (HIV) (table 4.3), again all the CHPS facilities (100%) provided infant and young child feeding counseling as part of prevention of mother-to-child transmission as well as nutrition counselling for HIV positive pregnant women and their infants and also provided HIV counseling and testing for pregnant women.

**Table 4. 3: CHPS compounds providing nutrition related services as part of PMTCT**

<b>Nutrition related service as part of PMTCT</b>	<b>Number</b>	<b>Percentage</b>
Provide HIV counselling and testing services to HIV positive pregnant women for PMTCT	22	100.0%
Provide infant and young child feeding counselling for PMTCT	22	100.0%
Provide nutritional counselling for HIV positive pregnant women and their infants for PMTCT	22	100.0%

Source: Field Survey, April 2019

#### 4.2.2.3. CHPS compounds providing nutrition related services at delivery

In relation to nutrition services during delivery (table 4.4), all CHPS facilities (100%) practiced immediate and exclusive breastfeeding at delivery while 68.2% of CHPS compound practiced administration of oxytocin injection immediately after birth to all women for the prevention of post-partum haemorrhage.



**Table 4. 4: CHPS compounds providing nutrition related services at delivery**

<b>Nutrition related service at delivery</b>	<b>Number</b>	<b>Percentages</b>
Administration of oxytocin injection immediately after birth to all women for the prevention of post-partum haemorrhage	15	68.2%
Immediate and exclusive breastfeeding	22	100%

Source: Field Survey, April 2019

#### **4.2.2.3. CHPS compounds providing nutrition services to children**

Regarding nutrition services for children, the evidence (table 4.5) showed that all CHPS compounds (100%) provide Vitamin A supplementation and child growth monitoring services. The results also showed that 95.5% of the CHPS compounds diagnose and/or treat child malnutrition, provide oral rehydration salt (ORS) to children with diarrhea and zinc supplementation to children with diarrhea. Only 68.2% of the CHPS compounds provide iron supplementation to children.

**Table 4. 5: CHPS compounds providing nutrition services to children**

<b>Nutrition service to children</b>	<b>Number</b>	<b>Percentage</b>
Diagnose and/or treat child malnutrition	21	95.5%
Provide vitamin A supplementation	22	100.0%
Provide iron supplementation	15	68.2%
Provide ORS to children with diarrhoea	21	95.5%
Provide zinc supplementation to children with diarrhoea	21	95.5%
Child growth monitoring	22	100.0%

Source: Field Survey, April 2019



#### 4.2.2.3. CHPS compounds using different strategies to deliver nutrition specific interventions

With regards to the strategies CHPS staff use to deliver maternal and child nutrition healthcare services, the evidence (table 4.6) show that all CHPS compounds (100%) practiced home visits, practiced static clinic and used school-based platforms to deliver maternal and child nutrition healthcare services.

**Table 4. 6: CHPS compounds using different strategies to deliver nutrition specific interventions**

Strategies to deliver nutrition specific interventions	Number	Percentage
Home visits by CHOs	22	100.0%
Use of defined community group(s)	21	95.5%
Home visits by volunteers	19	86.4%
Static clinic at the CHPS compound	22	100.0%
Through Integrated management of childhood illnesses (IMCIs)	21	95.5%
Use of child health days	20	90.9%
Use of school-based delivery platforms	22	100.0%

Source: Field Survey, April 2019





### 4.2.3. CHPS compounds readiness for maternal and child nutrition health care services delivery

The study examined the readiness of CHPS compounds to provide maternal and child nutrition healthcare services in relation to the following; categories of health staff working in CHPS compounds; CHPS compounds with health staff who received nutrition training in the last two years; CHPS compounds with equipment available and functional for the delivery of maternal and child nutrition services; CHPS compounds with guidelines/documents for the delivery of maternal and child nutrition services; CHPS compounds with essential maternal health medicines; CHPS compounds with essential child health medicines; and CHPS compounds with stock-out of essential medicines.

#### 4.2.3.1. Categories of staff living in CHPS compounds on the day of survey

Regarding staffing in CHPS zones, the results (**table 4.7**) showed that, the categories of community health officers living in CHPS compounds are Community Health Nurses (CHN), Enrolled Nurses (EN) and Midwives. The results also showed that, 43.6% of community health officers living in CHPS compounds in the Jirapa municipality are Community Health Nurses (Nurse assistant preventive), 30.8% are Midwives and 25.6% are Enrolled Nurses (Nurse assistant clinical).

**Table 4. 7: Categories of staff living in CHPS compounds on the day of survey**

Staff category	Number	Percentage
Community Health Nurse	17	43.6%
Midwife	12	30.8%
Enrolled Nurse	10	25.6%
Total	39	100%

Source: Field Survey, April 2019

#### 4.2.3.2. CHPS zones with at least one health staff trained in nutrition related area in the last two years

In respect of staff training (table 4.8), a little over a quarter of all CHPS compounds had at least one staff trained in infant and young child feeding in the last two years (27.3%), maternal and child nutrition in the last two years (27.3%) and community-based management of acute malnutrition (CMAM) in last two years (27.3%).

**Table 4. 8: CHPS zones with at least one health staff trained in nutrition related area in the last two years**

Training in nutrition related area	Number	Percentage
Received any PMTCT training in the last two years	2	9.1%
Received any training in infant and young child feeding in the last two years	3	13.6%
Received training in Kangaroo mother care in the last two years	2	9.1%
Received any ANC training in the last two years	2	9.1%
Received any training in IPTp in the last two years	2	9.1%
Received training in maternal and child nutrition in last two years	3	13.6%
Received training in CMAM in last two years	3	13.6%
Received any training in nutritional status assessment in last two years	1	4.5%
Received any training in growth monitoring in last two years	4	18.2%

Source: Field Survey, April 2019



#### 4.2.3.3. CHPS compounds with functional equipment for maternal and child healthcare services

The results (table 4.9) shows only 4.5% of the CHPS had a device/equipment for measuring hemoglobin level, 77.3% of the CHPS compounds had functional adult weighing scale while 68.2% had functional infant weighing scale. Only a little over half (54.5%) of the CHPS had functional motorbikes for the delivery of healthcare services.

**Table 4. 9: CHPS compounds with functional equipment for maternal and child healthcare services**

Equipment	Number	Percentage
Hemoglobin measuring device/Hemo cue	1	4.5%
Adult weighing scale	17	77.3%
Child weighing scale- 250 gram gradation	20	90.9%
Infant weighing scale-100 gram gradation	15	68.2%
Motorbike	12	54.5%
height board/stadiometre	20	90.9%

Source: Field Survey, April 2019





**4.2.3.4. CHPS compounds with maternal and child nutrition related guidelines/documents/protocols**

Almost all CHPS compounds (90.9%) had guidelines (table 4.10) for infant and child feeding counseling while 72.7% had guidelines for growth monitoring. Also, 86.4% of the CHPS compounds had ANC guidelines while 72.7% of the CHPS compounds had guidelines for prevention of mother-to-child transmission (PMTCT).

**Table 4. 10: CHPS compounds with maternal and child nutrition related guidelines/documents/ protocols**

<b>Guideline/document/ protocol</b>	<b>Number</b>	<b>Percentage</b>
National guidelines for PMTCT	16	72.7%
Guidelines for infant and young child feeding counseling	20	90.9%
National guidelines for growth monitoring	16	72.7%
ANC guidelines	19	86.4%
IPTp guidelines/job-aids	17	73.3%
Any national guidelines for essential childbirth/newborn care	12	54.5%

Source: Field Survey, April 2019



#### 4.2.3.5. CHPS compounds with stock of essential maternal medicines

With regards to essential maternal medicines (table 4.11) for the provision of nutrition healthcare services, 72.7% of the CHPS compounds visited had in stock iron tablets while less than three quarters (59.1%) of the CHPS compounds had folic acid tablets in stock.

**Table 4. 11: CHPS compounds with essential maternal medicines**

Essential maternal medicine	Number	Percentage
Iron tablets	16	72.7%
Folic acid tablets	13	59.1%
Iron and folic acid combined tablets	7	31.8%

Source: Field Survey, April 2019

#### 4.2.3.6. CHPS compounds with essential child health medicines

In respect of essential medicines for the provision of child nutrition healthcare services (table 4.12), about three quarters (72.7%) of the CHPS compounds had in stock Vitamin A on the day of the survey.

**Table 4. 12: CHPS compounds with essential child health medicines**

Essential child health medicine	Number	Percentage
ORS sachets	19	86.4%
Zinc sulphate tablets	12	54.5%
Zinc sulphate syrup or dispersible tablets	6	27.3%
Vitamin A (retinol) capsules	16	72.7%

Source: Field Survey, April 2019



#### 4.2.3.7. CHPS compounds who experienced stock-out of essential medicines in the past 3 months

At the time of the survey, 54.5% of the CHPS compounds had ever experienced stock-out (table 4.13) of iron tablets in the past three months, 45.5% ever experienced stock-out of folic acid tablets in the past three months and 40.9% ever experienced stock-out of vitamin A in the past three months.

**Table 4. 13: CHPS compounds who experienced stock-out of essential medicines in the past 3 months**

Essential medicine	Number	Percentage
Iron tablets	12	54.5%
Folic acid tablets	10	45.5%
Iron and folic acid combined tablets	17	77.3%
Zinc sulphate	12	54.5%
Zin sulphate syrup	13	59.1%
Vitamin A	9	40.9%

Source: Field Survey, April 2019



### **4.3. Prevalence of optimal maternal and child feeding indicators in CHPS zones**

The study assessed the prevalence of maternal and child feeding indicators in CHPS zones using the following indicators; household food consumption score (FCS); minimum dietary diversity (MDD); minimum meal frequency (MMF); minimum acceptable diet (MAD) and maternal knowledge on infant feeding.

#### **4.3.1. Household food consumption score (FCS), minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD)**

The findings on household maternal and child feeding indicators showed that, of the three hundred and fifty households interviewed, a little over a quarter (26.8%) of the households had a poor food consumption score (table 4.14), whereas about 59 percent of the households recorded a borderline food consumption score. The study also found that households with children aged 6 to 23 months numbered up to 178. Out of this figure, those who had met the requirement of a minimum meal frequency at the time of the study constituted about 71 percent whereas a little more than a quarter (28.7%) could not meet the requirement of the minimum meal frequency. In terms of meeting the recommended dietary diversity for the same group of children, about 78 percent of the children had met that requirement. Then also, 101 representing about 57 percent of 178 children had attained the requirement for a minimum acceptable diet.



**Table 4. 14: Household food consumption score (FCS), minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD)**

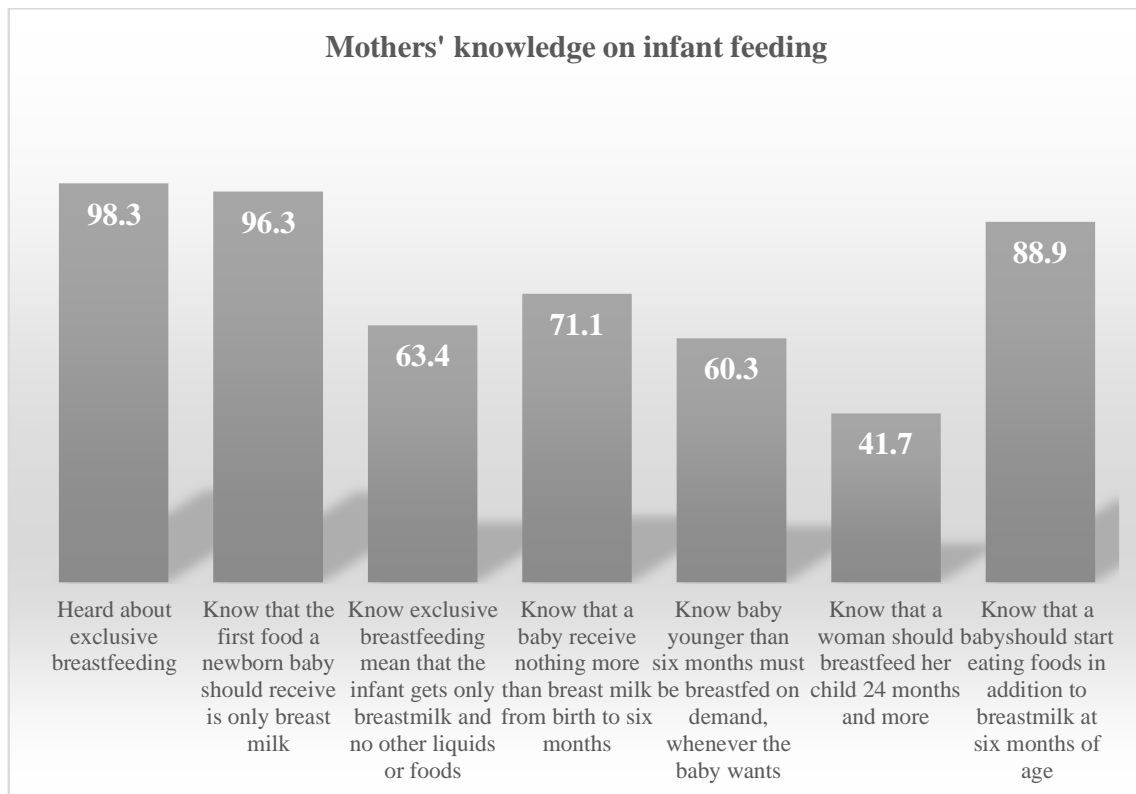
Variable	Number	Percentages
<b><i>Household Food Consumption Score</i></b>		
	<b>n = 350</b>	
Poor	94	26.8
Borderline	205	58.6
Acceptable	51	14.6
<b><i>Minimum Meal Frequency (MMF)</i></b>		
	<b>n = 178</b>	
No	51	28.7
Yes	127	71.3
<b><i>Minimum Dietary Diversity (MDD)</i></b>		
	<b>n = 178</b>	
No	39	21.9
Yes	139	78.1
<b><i>Minimum Acceptable Diet (MAD)</i></b>		
	<b>n = 178</b>	
No	77	43.3
Yes	101	56.7

Source: Field Survey, April 2019



### 4.3.2. Mothers knowledge on infant feeding

The result (figure 4.2) show that mothers' awareness of exclusive breastfeeding (98.3%) is almost universal and 96.3% of mother know that only breastmilk is the first food that a newborn baby should receive. Meanwhile 63.4% of mothers correctly know exclusive breastfeeding to mean that the infant gets only breastmilk and no other liquids or foods. The result also shows that only 41.7% of mothers know correctly that a woman should breastfeed her child for 24 months or more.



Source: Field Survey, April 2019

**Figure 4. 2: Maternal knowledge on infant feeding**





#### **4.4. Factors associated with optimal maternal and child feeding indicators in CHPS zones**

The study examined factors associated with optimal maternal and child feeding in CHPS zones in relation to the following indicators; household food consumption score (FCS); minimum dietary diversity (MDD); and minimum acceptable diet (MAD). Bivariate tests were used to identify association between categorical independent (exposure) variables and the dependent variables FCS, MDD and MAD. All statistically significant independent (exposure) variables from the bivariate tests were used in logistic regressions analysis to examine the determinants of household food consumption score, minimum dietary diversity, and minimum acceptable diet.

##### **4.4.1. Factors associated with household food consumption score (FCS)**

A bivariate test of association analysis was run using the Chi-square ( $\chi^2$ ) test and Fisher's (F) exact test to determine any statistically significant relationship between each of the independent variables and the dependent variable, household food consumption score. The analysis returned values with a p-value of less than 0.05 for education level of respondents, ethnicity of respondents, occupation of respondents, age of child, child feeding advice from family members, presence of cultural values or believes forbidding children from consuming certain foods, household decision-maker regarding food purchases and CHPS performance in maternal and child nutrition healthcare (table 4.15). The proportion of households with higher food consumption score increases significantly with increasing educational level; 25.5 percent of households with secondary/tertiary education were more likely to have an acceptable food consumption score relative to 18.9 percent of households with primary/JHS educational level and 7.4 percent of households with no schooling ( $p=0.001$ ). Households of respondents belonging to other tribes (74.3%) are more likely to have a borderline household food consumption score compared those of the Dagaare ethnic group (56.8%) ( $p=0.003$ ). The



research also identified that household food consumption score differed significantly across occupation of mothers. Compared to mothers with informal occupation (11.2%) and other occupations (5.9%), those with formal occupation (37.5%) were more favoured to have an acceptable household food consumption score ( $p < 0.001$ ). Households with children within the age bracket of 6-11 months (21.3%) were more likely to have acceptable household food consumption score compared to households with children  $< 6$  months (11.5%), 12 – 23 months (17.5%) and 24+ months (9.2%) age brackets ( $p = 0.031$ ). Household food consumption score also varies significantly across decisions making regarding food purchases at the household level; in households where mothers take decision about food purchases, 82.2 percent were more likely to make borderline food consumption score compared to 56.1 percent for husband/partner, 50 percent for mother/caregiver and father together group, 67.9 percent for elderly person in household/family group and 50 percent for mother/caregiver together with the elderly person in the household group ( $p = 0.025$ ). There was also a piece of strong evidence that in households where mothers receive dietary advice from family members regarding maternal and child feeding, 20.3 percent recorded poor household food consumption score which differed considerably from mothers who did not, 35.3 percent ( $p < 0.001$ ). It was again noted that households which responded no to the presence of cultural values or believes forbidding children from consuming certain foods representing 31.1 percent were more likely to score a poor food consumption score relative to those who responded yes represented by 11.7 percent ( $p = 0.003$ ). More so, the households under the catchment area of low-performing CHPS compounds significantly scored a poor food consumption score (31.9%) compared to 10.0 percent for households under high-performing CHPS compounds ( $p < 0.001$ ).



**Table 4. 15: Factors associated with household Food Consumption Score (FCS)**

Exposure variable	Household food consumption score				$\chi^2 / F$ (P-value)
	N	Poor n (%)	Borderline n (%)	Acceptable n (%)	
<b><i>Age of mother (years)</i></b>	<b>n= 350</b>				$\chi^2 = 5.389$ (0.250)
≤ 25	131	31 (23.7)	74 (56.5)	26 (19.8)	
26 – 35	173	48 (27.7)	105 (60.7)	20 (11.6)	
36+	46	15 (32.6)	26 (56.5)	5 (10.9)	
<b><i>The education level of respondent</i></b>	<b>n= 350</b>				$\chi^2 = 17.989$ (0.001)
No schooling	163	55 (33.7)	96 (58.9)	12 (7.4)	
Primary/JHS	132	30 (22.7)	77 (58.3)	25 (18.9)	
Secondary/ Tertiary	55	9 (16.4)	32 (58.2)	14 (25.5)	
<b><i>Number of living children</i></b>	<b>n= 350</b>				$\chi^2 = 3.372$ (0.498)
≤2	186	45 (24.2)	110 ((59.1)	31 (16.7)	
3 – 5	137	42 (30.7)	80 (58.4)	15 (10.9)	
6+	27	7 (25.9)	15 (55.6)	5(18.5)	
<b><i>Ethnicity of respondents</i></b>	<b>n= 350</b>				<b>F = (0.003)</b>
Dagaare	315	93 (29.5)	179 (56.8)	43 (13.7)	
Others	35	1 (2.9)	26 (74.2)	8 (22.9)	
<b><i>Occupation of respondents</i></b>	<b>n= 350</b>				<b>F = (0.000)</b>
Informal Occupation	295	85 (28.8)	117 (60.0)	33(11.2)	
Formal Occupation	40	5 (12.5)	20 (50.0)	15 (37.5)	
Other	15	4 (26.7)	8 (53.3)	20 (5.9)	



Exposure variable	Household food consumption score				$\chi^2 / F$ (P-value)
	N	Poor n (%)	Borderline n (%)	Acceptable n (%)	
<b><i>Age of child (months)</i></b>	<b>n= 350</b>				$\chi^2 = 13.846$ (0.031)
<6	52	11 (21.2)	35 (67.3)	6 (11.5)	
6 – 11	75	14 (18.7)	45 (60.0)	16 (21.3)	
12 – 23	103	25 (24.3)	60 (58.3)	18 (17.5)	
24+	120	44 (36.7)	65 (54.2)	11 (9.2)	
<b><i>Sex of child</i></b>	<b>n= 350</b>				$\chi^2 = 0.458$ (0.795)
Male	145	37 (25.5)	88 (60.7)	20 (13.8)	
Female	205	57 (27.8)	117 (57.1)	31 (15.1)	
<b><i>Maternal nutrition knowledge</i></b>	<b>n= 350</b>				$\chi^2 = 2.297$ (0.317)
Low	110	28 (25.5)	70 (63.6)	12 (10.9)	
High	240	66 (27.5)	135 (56.3)	39 (16.3)	
<b><i>Main challenge in accessing ANC services</i></b>	<b>n= 350</b>				<b>F = (0.605)</b>
Distrust for CHOs	28	10 (35.7)	16 (57.1)	2 (7.1)	
Distance to the health facility	94	22 (23.4)	56 (59.6)	16 (17.0)	
Lack of adequate services	228	62 (27.2)	133 (58.3)	33 (14.5)	





Exposure variable	Household food consumption score				$\chi^2$ / F (P-value)
	N	Poor n (%)	Borderline n (%)	Acceptable n (%)	
<b><i>Household decision-maker regarding food purchases</i></b>	<b>n= 350</b>				<b>F= (0.025)</b>
Mother/caregiver	29	2 (6.9)	24 (82.8)	3 (10.3)	
Husband/partner or other man in the household	171	45 (26.3)	96 (56.1)	30 (17.5)	
Mother/caregiver and father together	80	30 (37.5)	40 (50.0)	10 (12.5)	
Elderly person in household/family	56	11 (19.6)	38 (67.9)	7 (12.5)	
Mother/caregiver together with the elderly person in the household	14	6 (42.9)	7 (50.0)	1 (7.1)	
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>	<b>n= 350</b>				<b><math>\chi^2 = 21.292 (0.000)</math></b>
Yes	197	40 (20.3)	115 (58.4)	42 (21.3)	
No	153	54 (35.3)	90 (58.8)	9 (5.9)	
<b><i>Presence of cultural values or beliefs forbidding mothers from consuming certain foods</i></b>	<b>n= 350</b>				<b><math>\chi^2 = 5.686 (0.058)</math></b>
Yes	87	15 (17.2)	59 (67.8)	13 (14.9)	
No	263	79 (30.0)	146 (55.5)	38 (14.4)	

Exposure variable	Household food consumption score				$\chi^2 / F$ (P-value)
	N	Poor n (%)	Borderline n (%)	Acceptable n (%)	
<i>Presence of cultural values or believes forbidding children from consuming certain foods</i>	<b>n= 350</b>				$\chi^2 = 11.904$ (0.003)
Yes	77	9 (11.7)	56 (72.7)	12 (15.6)	
No	273	85 (31.1)	149 (54.6)	39 (14.3)	
<b>CHPS performance</b>	<b>n= 350</b>				$\chi^2 = 27.125$ (0.000)
Households under low-performing CHPS zones	270	86 (31.9)	138 (51.1)	46 (17.0)	
Households under high-performing CHPS zones	80	8 (10.0)	67 (83.7)	5 (6.3)	

Source: Field Survey, April 2019



#### 4.4.2. Factors associated with minimum dietary diversity (MDD)

Bivariate tests of independence were performed using Chi-square test and Fisher's (F) exact test to examine the association between the independent variables against the outcome variable, minimum dietary diversity. Some of the independent variables presented significant evidence of associations with the dependent variable, minimum dietary diversity (table 4.16). The researcher found that female children (83.8%) were more likely to meet their minimum dietary diversity requirement compared to their male (70.9%) counterparts ( $p=0.038$ ). The study findings further revealed that the children of mothers who responded yes to receiving dietary advice from family members regarding maternal and child feeding were relatively more likely to have their minimum dietary diversity score than children of respondents who said no to such practice ( $p=0.033$ ). With regards to presence of cultural values or believes forbidding mothers from consuming certain foods, 90.5 percent of children of respondents who said yes to the question varied significantly from the children of mothers who responded no, 74.3 percent ( $p=0.026$ ). It was again found that the proportion of respondents who replied yes to the presence of cultural values or believes forbidding children from consuming certain foods in the community had their children meeting their minimum dietary diversity (92.1%) significantly more than the those who responded no (74.3%) to the question ( $p=0.019$ ). Minimum dietary diversity again varied considerably across household food consumption score categories. Relative to poor and borderline household food consumption scores, children belonging to household with acceptable food consumption scores (97.1%) were more likely to meet their minimum dietary diversity ( $p=0.009$ ).



**Table 4. 16: Factors associated with minimum dietary diversity (MDD)**

Exposure variable	Minimum Dietary Diversity (MDD)			$\chi^2$ /F (P-value)
	n	No n (%)	Yes n (%)	
<b><i>Age of mother (years)</i></b>	<b>n= 178</b>			<b>F = (0.834)</b>
≤ 25	81	17 (21.0)	64 (79.0)	
26 – 35	85	20 (23.5)	65 (76.5)	
36+	12	2 (16.7)	10 (83.3)	
<b><i>Education level of respondent</i></b>	<b>n= 178</b>			<b><math>\chi^2 = 0.863 (0.649)</math></b>
No schooling	62	13 (21.0)	49 (79.0)	
Primary/JHS	81	20 (24.7)	61 (75.3)	
Secondary / Tertiary	35	6 (17.1)	29 (82.9)	
<b><i>Number of living children</i></b>	<b>n= 178</b>			<b>F = (0.161)</b>
≤2	104	22 (21.2)	82 (78.8)	
3 – 5	64	17 (26.6)	47 (73.4)	
6+	10	0 (0.0)	10 (100.0)	
<b><i>Ethnicity of respondents</i></b>	<b>n= 178</b>			<b>F = (0.468)</b>
Dagaare	166	38 (22.9)	128 (77.1)	
Others	24	1 (8.3)	11 (91.7)	
<b><i>Occupation of respondents</i></b>	<b>n= 178</b>			<b>F = (0.665)</b>
Informal Occupation	142	33 (23.2)	109 (76.8)	
Formal Occupation	26	4 (15.4)	22 (84.6)	
Other	10	2 (20.0)	8 (80.0)	





Exposure variable	Minimum Dietary Diversity (MDD)			$\chi^2/F$ (P-value)
	n	No n (%)	Yes n (%)	
<b>Age of child (months)</b>	<b>n= 178</b>			$\chi^2 = 0.043$ (0.835)
6 – 11	75	17 (22.7)	58 (77.3)	
12 -23	103	22 (21.4)	81 (78.6)	
<b>Sex of child</b>	<b>n= 178</b>			$\chi^2 = 4.308$ (0.038)
Male	79	23 (29.1)	56 (70.9)	
Female	99	16 (16.2)	83 (83.8)	
<b>Maternal nutrition knowledge</b>	<b>n= 178</b>			$\chi^2 = 0.363$ (0.547)
Low	62	12 (19.4)	50 (80.6)	
High	116	27 (23.3)	89 (76.7)	
<b>The main challenge in accessing ANC services</b>	<b>n= 178</b>			$\chi^2 = 2.091$ (0.352)
Distrust for CHOs	20	6 (30.0)	14 (70.0)	
Distance to the health facility	45	12 (26.7)	33 (73.3)	
Lack of adequate services	113	21 (18.6)	92 (81.4)	
<b>Household decision-maker regarding food purchases</b>	<b>n= 178</b>			<b>F = (0.940)</b>
Mother/caregiver	16	4 (25.0)	12 (75.0)	
Husband/partner or another man in the household	83	19 (22.9)	64 (77.1)	
Mother/caregiver and father together	48	9 (18.8)	39 (81.3)	
Elderly person in household/family	24	6 (25.0)	18 (75.0)	
Mother/caregiver together with the elderly person in the household	7	1 (14.4)	6 (85.7)	



Exposure variable	Minimum Dietary Diversity (MDD)			$\chi^2$ /F (P-value)
	n	No n (%)	Yes n (%)	
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>	<b>n= 178</b>			$\chi^2 = 4.526$ (0.033)
Yes	104	17 (16.3)	87 (83.7)	
No	74	22 (29.7)	52 (70.3)	
<b><i>Presence of cultural values or believes forbidding mothers from consuming certain foods</i></b>	<b>n= 178</b>			<b>F = (0.026)</b>
Yes	42	4 (9.5)	38 (90.5)	
No	136	35 (25.7)	101 (74.3)	
<b><i>Presence of cultural values or believes for bidding children from consuming certain foods</i></b>	<b>n= 178</b>			<b>F = (0.019)</b>
Yes	38	3 (7.9)	35 (92.1)	
No	140	36 (25.7)	104 (74.3)	
<b><i>Household food consumption score</i></b>	<b>n= 178</b>			<b>F = (0.009)</b>
Poor	39	12 (30.8)	27 (69.2)	
Borderline	105	26 (24.8)	79 (75.2)	
Acceptable	34	1 (2.9)	33 (97.1)	
<b><i>CHPS performance</i></b>	<b>n= 178</b>			$\chi^2 = 0.093$ (0.761)
Households under low-performing CHPS zones	143	32 (22.4)	111 (77.6)	
Households under high-performing CHPS zones	35	7 (20.0)	28 (80.0)	

Source: Field Survey, April 2019



#### 4.4.3. Factors associated with minimum acceptable diet (MAD)

After running bivariate tests of association using a Chi-square test and Fisher's (F) exact test to assess the association between the independent variables and minimum acceptable diet, variables such as; occupation of respondents, age of child, received dietary advice from family members regarding maternal and child feeding, household food consumption score, minimum meal frequency, minimum dietary diversity, and CHPS performance were significantly associated with minimum acceptable diet (table 4.17). The study findings show that children of respondents with informal occupation (48.6%) did not meet their minimum acceptable diet compared to children of mothers with formal occupations (23.1%) and children belonging to mothers with other occupations (20.0%) interviewed ( $p=0.017$ ). In terms of age of the children of the mothers interviewed, the older children were more likely to not meet their requirement for minimum acceptable diet ( $p=0.010$ ). In furtherance, the association between household food consumption score and minimum acceptable diet was also explored. The finding show that increase in household food consumption score is significantly associated with adequate minimum acceptable diet ( $p<0.001$ ). Mothers who receive dietary advice from family members regarding maternal and child feeding turn to have children (67.3%) who meet their minimum acceptable diet compared to the mothers of children (41.9%) who do not receive such advice ( $p=0.001$ ). Again, it was realized that children who met their minimum meal frequency, 19.4% percent were likely not to meet their minimum acceptable diet compared to children who did not meet their minimum meal frequency, 100.0 percent ( $p<0.001$ ). Furthermore, the proportion of children who met their minimum acceptable diet significantly differed by minimum dietary diversity ( $p<0.001$ ). It was also evident that CHPS performance was associated with children's minimum acceptable diet score. The proportion of children from households under low-performing CHPS



facilities were more favored to meet their minimum acceptable diet relative to children from households under high-performing CHPS zones ( $p=0.026$ ).

**Table 4. 17: Factors associated with minimum acceptable diet**

Exposure variable	Minimum Acceptable Diet (MAD)			$\chi^2/F$ (P-value)
	n	No n (%)	Yes n (%)	
<b><i>Age of mother (years)</i></b>	<b>n= 178</b>			<b>F = (0.441)</b>
≤ 25	81	39 (48.1)	42 (51.9)	
26 - 35	85	34 (40.0)	51 (60.0)	
36+	12	4 (33.3)	8 (66.7)	
<b><i>Education level of respondent</i></b>	<b>n= 178</b>			<b><math>\chi^2 = 1.812</math> (0.404)</b>
No schooling	62	30 (48.4)	32 (51.6)	
Primary/JHS	81	43 (43.2)	46 (56.8)	
Secondary/Tertiary	35	12 (34.3)	23 (65.7)	
<b><i>Number of living children</i></b>	<b>n= 178</b>			<b>F = (0.092)</b>
≤2	104	47 (45.2)	57 (54.8)	
3 – 5	64	29 (45.3)	35 (54.7)	
6+	10	1 (10.0)	9 (90.0)	
<b><i>Ethnicity of respondents</i></b>	<b>n= 178</b>			<b>F = (0.071)</b>
Dagaare	166	75 (45.2)	90.1 (54.8)	
Others	12	2 (16.7)	10 (83.3)	
<b><i>Occupation of respondents</i></b>	<b>n= 178</b>			<b>F = (0.017)</b>
Informal Occupation	142	69 (48.6)	73 (51.4)	
Formal Occupation	26	6 (23.1)	20 (76.9)	
Other	10	2 (20.0)	8 (80.0)	





Exposure variable	Minimum Acceptable Diet (MAD)			$\chi^2/F$ (P-value)
	n	No n (%)	Yes n (%)	
<b>Age of child (months)</b>	<b>n= 178</b>			$\chi^2 = 6.693$ (0.010)
6 – 11	75	24 (32.0)	51 (68.0)	
12 - 23	103	53 (51.5)	50 (48.5)	
<b>Sex of child</b>	<b>n= 178</b>			$\chi^2 = 1.357$ (0.244)
Male	79	38 (48.1)	41 (51.9)	
Female	99	39 (39.4)	60 (60.6)	
<b>Maternal nutrition knowledge</b>	<b>n= 178</b>			$\chi^2 = 0.140$ (0.708)
Low	62	28 (45.2)	34 (54.8)	
High	116	49 (42.2)	67 (57.8)	
<b>Main challenge in accessing ANC services</b>	<b>n= 178</b>			$\chi^2 = 5.658$ (0.059)
Distrust for CHOs	20	13 (65.0)	7 (35.0)	
Distance to the health facility	45	15 (33.3)	30 (66.7)	
Lack of adequate services	113	49 (43.4)	64 (56.6)	



Exposure variable	n	Minimum Acceptable Diet (MAD)		$\chi^2/F$ (P-value)
		No	Yes	
<b><i>Household decision-maker regarding food purchases</i></b>	<b>n= 178</b>			<b>F = (0.606)</b>
Mother/caregiver	16	6 (37.5)	10 (62.5)	
Husband/partner or another man in the household	83	34 (41.0)	49 (59.0)	
Mother/caregiver and father together	48	21 (43.8)	27 (56.3)	
Elderly person in household/family	24	11 (45.8)	13 (54.2)	
Mother/caregiver together with the elderly person in the household	7	5 (71.4)	2 (28.6)	
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>	<b>n= 178</b>			<b><math>\chi^2 = 11.378</math> (0.001)</b>
Yes	104	34 (32.7)	70 (67.3)	
No	74	43 (58.1)	31 (41.9)	
<b><i>Presence of cultural values or beliefs for bidding mothers from consuming certain foods</i></b>	<b>n= 178</b>			<b><math>\chi^2 = 1.275</math> (0.259)</b>
Yes	42	15 (35.7)	27 (64.3)	
No	136	62 (45.6)	74 (54.4)	



Exposure variable	Minimum Acceptable Diet (MAD)			$\chi^2$ /F (P-value)
	n	No n (%)	Yes n (%)	
<b><i>Presence of cultural values or believes forbidding children from consuming certain foods</i></b>	<b>n= 178</b>			$\chi^2 = 0.810 (0.368)$
Yes	38	14 (36.8)	24 (63.2)	
No	140	63 (45.0)	77 (55.0)	
<b><i>Household food consumption score</i></b>	<b>n= 178</b>			<b>F = (0.000)</b>
Poor	39	25 (64.1)	14 (35.9)	
Borderline	105	50 (47.6)	55 (52.4)	
Acceptable	34	2 (5.9)	32 (94.1)	
<b><i>Minimum meal frequency</i></b>	<b>n=175</b>			<b>F = (0.000)</b>
Yes	124	24 (19.4)	100 (80.6)	
No	51	51 (100.0)	0 (0.0)	
<b><i>Minimum dietary diversity</i></b>	<b>n= 178</b>			<b>F = (0.000)</b>
Yes	139	38 (27.3)	101 (72.7)	
No	39	39 (100.0)	0 (0.0)	
<b><i>CHPS performance</i></b>	<b>n= 178</b>			$\chi^2 = 4.975 (0.026)$
Households under low-performing CHPS zones	143	56 (39.2)	87 (60.8)	
Households under high-performing CHPS zones	35	21 (60.0)	14 (40.0)	

Source: Field Survey, April 2019

#### 4.4.4. Determinants of household food consumption score (FCS)

All statistically significant variables from the Chi-square test were put in a multivariate logistic regression model. The reference groups for the independent variables were given adjusted odds ratio (AOR) of 1.00. After controlling for the effect of the other variables in the multinomial logistic regression, ethnicity, age of child and dietary advice from family members regarding maternal and child feeding (table 4.18) were on one hand still significantly associated with household food consumption score. Households with Dagaare ethnicity had low likelihood of only 7% chance of having an acceptable household food consumption score [(AOR: 0.068, 95%, CI: 0.007 - 0.690, p=0.023)] compared to other ethnic groups. The study finding also showed that households with children within the age bracket of 6 to 11 months was associated with increased odds of having an acceptable household food consumption score. Compared to households with children under 6 months of age (reference group), household with children 6-11 months old had about four and half times the odds [(AOR: 4.500, 95%, CI: 1.072 - 18.881, p=0.040)] of recording an acceptable household food consumption score. Further, households with mothers who receive dietary advice from family members regarding maternal and child feeding have 80.1% chance less [(AOR: 0.199, 95%, CI: 0.079 - 0.500, p=0.001)] of having an acceptable household food consumption score.



**Table 4. 18: Determinants of household food consumption score (FCS)**

	Household food consumption score (FCS)	
	AOR (95% CI)	P-value
<b><i>Educational level</i></b>		
No schooling	1	
Primary school/JHS	1.845 (0.729 - 4.670)	0.196
Secondary school /Tertiary	1.828 (0.486 - 6.881)	0.373
<b><i>Ethnicity</i></b>		
Others	1	
Dagaare	0.068 (0.007 - 0.690)	0.023
<b><i>Occupation of respondents</i></b>		
Other	1	
Informal Occupation	1.174 (0.198 - 6.978)	0.860
Formal Occupation	7.123 (0.833 - 60.899)	0.073
<b><i>Age of child (months)</i></b>		
<6	1	
6 - 11	4.500 (1.072 - 18.881)	0.040
12 - 23	2.706 (0.706 - 10.377)	0.147
24+	1.403 (0.357 - 5.511)	0.628
<b><i>Household decision-maker regarding food purchases</i></b>		
Mother/caregiver together with the elderly person in the household	1	
Mother/caregiver	4.333 (0.223 - 84.266)	0.333
Husband/partner or other man in the household	2.660 (0.247 - 28.603)	0.419
Mother/caregiver and father together	0.701 (0.059 - 8.354)	0.779
Elder person in household/family	0.951 (0.071 - 12.694)	0.970



	Household food consumption score (FCS)	
	AOR (95% CI)	P-value
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>		
No	1	
Yes	0.199 (0.079 - 0.500)	0.001
<b><i>Presence of cultural values or believes forbidding children from consuming certain foods</i></b>		
No	1	
Yes	0.417 (0.142 - 1.226)	0.112
<b><i>CHPS performance</i></b>		
Households under low-performing CHPS zones	1	
Households under high-performing CHPS zones	1.862 (0.515 - 6.734)	0.343

Source: Field Survey, April 2019

#### **4.4.5. Determinants of minimum dietary diversity of children**

Again, the independent variables that showed statistical significance against minimum dietary diversity in the bivariate Chi-square test were included in a binary logistic regression. After adjusting for other factors, only household food consumption score turned to be a predictor of minimum dietary diversity (table 4.19). An increase in household food consumption score significantly predicts meeting minimum dietary diversity of children. Children from households with an acceptable food consumption score have more than ten times likelihood [(AOR: 10.542, 95%, CI: 1.235 - 90.011, p=0.031)] of meeting their minimum dietary diversity compared to children from households with a poor food consumption score.





**Table 4. 19: Determinants of minimum dietary diversity of children**

	Minimum Dietary Diversity (MDD)	
	AOR (95% CI)	P-value
<b><i>Sex of child</i></b>		
Male	1	
Female	2.024 (0.937 - 4.374)	0.073
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>		
No	1	
Yes	0.629 (0.291 - 1.362)	0.240
<b><i>Presence of cultural values or believes forbidding mothers from consuming certain foods</i></b>		
No	1	
Yes	0.709 (0.096 - 5.264)	0.737
<b><i>Presence of cultural values or believes forbidding children from consuming certain foods</i></b>		
No	1	
Yes	0.349 (0.038 - 3.221)	0.353
<b><i>Household Food Consumption Score</i></b>		
Poor	1	
Borderline	1.131 (0.478 - 2.674)	0.779
Acceptable	10.542 (1.235 - 90.011)	0.031

Source: Field Survey, April 2019



#### 4.4.6. Determinants of minimum acceptable diet of children

After running a Chi-square test to determine any statistically significant associations between exposure variables and the outcome variable, minimum acceptable diet, only occupation of respondents did not show a significant association with the outcome variable (table 4.20). The evidence show that as children age, the likelihood of meeting their minimum acceptable diet decreases. Older children, 12-13 months of age have about 41.2 percent chance [(AOR: 0.412, 95%, CI: 0.198 - 0.856, p=0.017)] of meeting their minimum acceptable diet requirement compared to younger children between the ages of 6-11 months old. Children whose mothers receive dietary advice from family members regarding maternal and child feeding have about 0.4 odds [(AOR: 0.387, 95%, CI: 0.187 - 0.802, p=0.011)] meeting their minimum acceptable diet compared to children whose mothers do not receive dietary advice from family members regarding maternal and child feeding. The study findings further show that increase in household food consumption score is strongly related to meeting the requirement for minimum acceptable diet. Relative to households with poor score for household food consumption, children in households with borderline food consumption score have more than double the odd [(AOR: 2.483, 95%, CI: 1.050 - 5.869, p=0.038)] of meeting their minimum acceptable diet. More so, children from households with acceptable food consumption score are more likely to meet their minimum acceptable diet by more than 23 folds [(AOR: 23.250, 95%, CI: 4.549 - 118.834, p<0.001)] compared to children from households with a poor food consumption score. The adjusted odds ratio showed that compared with children from households under high-performing CHPS zones, children from households under low-performing CHPS zones were less likely [(AOR: 0.387, 95%, CI: 0.158 - 0.949, p<0.038)] to meet the minimum acceptable diet.



**Table 4. 20: Determinants of minimum acceptable diet of children**

	Minimum Acceptable Diet (MAD)	
	AOR (95% CI)	P-value
<b><i>Occupation of respondents</i></b>		
Other	1	
Informal Occupation	0.256 (0.046 - 1.414)	0.118
Formal Occupation	0.418 (0.056 - 3.104)	0.394
<b><i>Age of child (months)</i></b>		
6 – 11	1	
12 - 23	0.412 (0.198 - 0.856)	0.017
<b><i>Receive dietary advice from family members regarding maternal and child feeding</i></b>		
No	1	
Yes	0.387 (0.187 - 0.802)	0.011
<b><i>Household food consumption score</i></b>		
Poor	1	
Borderline	2.483 (1.050 - 5.869)	0.038
Acceptable	23.250 (4.549 - 118.834)	0.000
<b><i>CHPS performance</i></b>		
High-performing CHPS zones	1	
Low-performing CHPS zones	0.387 (0.158 - 0.949)	0.038

Source: Field Survey, April 2019





#### **4.5. Strategies to strengthen CHPS health care services delivery and improve maternal and child nutrition health promotion activities in CHPS zones**

In-depth interviews (twelve in-depth interviews) were conducted with health staff to identify strategies which can strengthen healthcare services delivery in order to improve maternal and child nutrition health promotion activities in CHPS zones. The strategies have been categorized under four (4) main groups; (1) strategies for community health volunteers' contribution to primary health care services; (2) strategies for community health management committee contribution to primary healthcare services; (3) strategies for CHOs to improve nutrition healthcare services and (4) strategies for municipal health administration to improve maternal and child nutrition healthcare services in CHPS zones.

##### **4.5.1. Strategies for community health volunteers' contribution to primary health care services**

Five dominant themes were generated from the in-depth interviews with community health officers and staff of the municipal health management team about strategies which can improve community health volunteers' contribution to primary health care services in CHPS zones. The themes are; (i) commitment among community health volunteers towards primary health services; (ii) Motivation of community health volunteers for their services; (iii) regular training of volunteers on primary health services; (iv) Provision of required logistics for community health volunteer services and (v) regular engagement with community health volunteers. The predominant theme identified from the data set was motivation of community health volunteers. Provision of required logistics for community health volunteer services was also apparent. Most of the study participants believed that if community health volunteers are given the requisite logistics and are motivated with some incentives, they will contribute much better in the

provision of primary health care services for that matter maternal and child nutrition healthcare activities in CHPS zones. The five dominant themes that emerged from the qualitative data analysis are explained as follows.

#### **4.5.1.1. Commitment among community health volunteers to primary health Services**

The participants reported that, community health volunteers need to willfully develop a sense of commitment towards primary health care services without necessarily waiting for incentives before they can put up their best towards healthcare services delivery in the communities. Participants believed that since the work of the community health volunteer is by its nature “volunteerism”, if a person accept to be a community health volunteer, they should do so wholeheartedly. Some of the statements from the in-depth interviews highlighted below exemplifies the need for commitment from community health volunteers to primary health care services.

*“My recommendation will just be on commitment to what they [Community Health Volunteers] are doing. The word is volunteerism, don’t expect anything for whatever you [Community Health Volunteer] are doing or what human will give you or don’t expect salary. If you [Community Health Volunteer] have accepted to do it [Provide Primary Health Care Services], you should do it whole heartedly.”*

#### **4.5.1.2. Motivation of community health volunteers for their services**

The participants reported that motivation of volunteers with incentives is crucial for community health volunteers to contribute much better or to increase efforts or to improve towards primary health care services delivery and for that matter maternal and child nutrition health care services in the communities. The participants believed that though the community health volunteers are supposed to render their services freely, they need to be motivated in order to maintain their interest towards continuous participation in the provision of primary health care services in the



communities. Participants were of the view that community health volunteers' interest in participation in the provision of primary health care services have reduced over the years and continue to reduce as a result of lack of motivation for community health volunteers. Below is an example of extracts of statements from the in-depth interviews with study participants.

*“They [Community Health Volunteers] need motivation so that they will be able to do their work [Provide Primary Health Care Services]. Motivation can be anything at all, either money or any other thing.....If you don't motivate them [Community Health Volunteers], they [Community Health Volunteers] will not do the work [Provide Primary Health Care Services].”*

#### **4.5.2. Strategies for community health management committee (CHMC) contribution to primary health care services**

With regards to strategies to enable community health management committee to improve on their contribution to primary health care activities in CHPS zones, four (4) main themes were identified from the qualitative data set. The dominant themes generated are; (i) unity among community health management committee members; (ii) seeking the approval of community health management committee before embarking on healthcare services delivery in the communities; (iii) Motivation of community health management committee members and (iv) training/education of community health management committee members on community health issues. The most prevalent theme from the in-depth interviews among the respondents was training/education of community health management committee members on community health issues and the need for all community members to be healthy. The themes that emerged from the analysis are explained as follows.



#### 4.5.2.1. Unity among community health management committee members

Participants reported that the community health management committee formulate and implement health policies in the community. Therefore, the respondents were of the view that unity among the community health management committee members was paramount in ensuring effective health care services delivery in the communities. Participants believed that if the community health committee members are not united, primary health care efforts in the communities may fail as it may be difficult to build consensus in the community regarding primary health care services. The following statement from a participant exemplify the need for unity among community health management committee members.

*“The concept of CHPS stands or rest on the hands of the community,.....and if these people [Community Health Management Committee] are not united, and they are not working towards their main purpose, the concept of CHPS will be dying out in that community.....So, if you have a loose community health management committee, things [Primary Health Care Services] cannot be done, but when they are together [United], things [Primary Health Care Services] that are to be done, they [Community Health Management Committee] will make sure that they are done.”*





#### **4.5.2.2. Seeking the approval of community health management committee before embarking on healthcare services delivery in the communities**

Participant also reported that seeking the consent of community health management committee before undertaking any healthcare services endeavor is key to the success of the particular primary health care effort. The respondents believed that the community health community members and for that matter the community members will support or cooperate in a particular health care issue if the decision is born out of the community through the community health management committee.

*“I recommend that before we [CHOs] do anything [Provide Primary Health Care services], they are the first people that we meet and discuss with them. We need to meet them and tell them these are our [CHOs] challenges and we sit as a house and see how we can solve the challenges in the community. Looking at their [Community Health Committee] work, it is similar to the volunteers, but for them they also implement health policies in the communities.”*

#### **4.5.2.3. Motivation of community health management committee members**

The reports from the in-depth interviews with participants show that motivation of community health management committee is one important strategy for community health management committee to improve their contribution to primary health care activities in the communities. Participants believed that community health management committee members need motivation to continue to contribute their best to primary health care efforts in the communities. The statements below exemplify the need for motivation of community health committee members.

*“I think we [Health Workers] should motivate them.....We [Health Workers] should give them support .....At least in every sitting, [Community Health Management Committee meeting] some water [Incentive] for them or every quarter when we hold meetings, at least some pure water money [Incentive] so that they will be motivated to discharge their duties.....Because anybody who is working with the health [Ghana Health Service], they [Community Members] think they [Health Workers] pay them.”*



#### **4.5.2.4. Training/education of community health management committee members on community health issues**

Participants believed that, the community health management committee takes the lead in decisions in the community about whether community members should participate or cooperate in a particular healthcare services endeavor in the communities. Hence, participants were of the view that once the community health management committee members are well informed about a particular health issue in the community and they support the need for prevention/control and or treatment/cure of the particular health issue in the community, the community health management members will formulate a policy which will compel all community member concerned about the particular health problem to participate favorably or cooperate in the healthcare services delivery endeavor about the particular health issue. Example of extracts about training/education of community health management committee members is shown below.

*“From my own experience, I think annual training on their [Community Health Management Committee] responsibilities is very paramount.....The health committee members are the people that are leading the community members. So for them, you talk to them [education/train] about the importance of health in the community. When they [Community Health Management Committee] get to know that it is important for everybody to be healthy in the community, they support the Nurse in the community to bring about the health issues in the community well.....When you are able to educate them [Community Health Management Committee] or you are able to talk to them about the importance of the community members being healthy, then they [Community Health Management Committee] will now take the lead in managing the community for you.”*





### **4.5.3. Strategies for CHOs contribution to maternal and child nutrition healthcare in CHPS zones**

Four (4) dominant themes were presented from the qualitative data set obtained from the participants through in-depth interviews about strategies which community health officers can implore to improve maternal and child nutrition healthcare in CHPS. The main themes generated are; (i) proper planning for maternal and child nutrition health care services in CHPS zone; (ii) proper community engagement; (iii) proper/intensifying home-visits by CHOs (iv) increased commitment among CHOs to maternal and child nutrition healthcare services. Proper community engagement and proper home visits were the most dominant themes which participants believed are very important strategies that CHOs can employ to improve maternal and child nutrition healthcare services in CHPS zones. Most participants were of the view that if CHOs engage more with community members and intensify proper home visits in the communities, it would improve maternal and child nutrition healthcare services in CHPS zones. The four main themes identified from the qualitative data set are explained below.

#### **4.5.3.1. Proper planning for maternal and child nutrition health care services in CHPS zone**

Participants believed that proper planning for maternal and child nutrition activities in CHPS zones is necessary for improving maternal and child nutrition health promotion activities in CHPS zones. Participants reported that if CHOs include maternal and child nutrition health promotion activities in their routine schedule, maternal and child nutrition health promotion activities will be mainstreamed in CHPS zones. The extract below exemplifies the need for proper planning of maternal and child nutrition healthcare activities in CHPS zones.

*“You [CHO] need to plan your [CHO] work and schedule your work to the extent that there is no time left out supporting community nutrition; that is through Infant and Young Child Feeding and the rest.”*

#### 4.5.3.2. Proper community engagement in CHPS zones

Participants believed that proper engagement with community members would help improve maternal and child nutrition health care activities. Participants were of the view that regular meeting with community support-groups such as mother-to-mother support-groups and organizing community durbar to sensitize community members on maternal and child nutrition issues among others are important strategies to improve maternal and child nutrition health promotion in CHPS zones. The respondents reported that by having regular engagement with community and educating them on maternal and child nutrition, it would help improve on optimal maternal and child nutrition practices in the communities. An example from participants about the need for proper community engagement is shown below.

*“I think we have to hold monthly meetings to educate the community through our durbars and through the child welfare clinic.... We [CHOs] should conduct durbars and educate them [community members] on all these [maternal and child nutrition].”*

#### 4.5.3.3. Proper/intensifying home-visits by CHOs

Participants reported that home-visits by CHOs play a very important role in improving maternal and child nutrition in CHPS zones. Participants believed that through home-visits, CHOs could have the opportunity to have one-on-one interaction with mothers, caregivers and family members which serves as a good platform to address specific nutrition issues at the household level. An example from participants is shown below.

*“The CHOs should do weekly home-visits on education concerning nutrition to the mothers at home. And do individual counseling for nursing mothers and pregnant women.....We still need to stand firm by intensifying our education to our people. We can educate them more by moving from house-to-house, going closer to the people...I think home visiting will strengthen maternal and child nutrition health promotion.”*



#### **4.5.3.4. Increased commitment among CHOs to maternal and child nutrition healthcare services**

Participants reported that commitment to provide maternal and child nutrition healthcare services is essential in improving maternal and child nutrition healthcare in CHPS zones. The respondents believed that if all CHOs are committed to maternal and child nutrition healthcare agenda, a positive gain can be made regarding maternal and child nutrition in CHPS zones. The statement below is an example indicating the need for commitment to maternal and child nutrition healthcare among CHOs.

*“They [CHOs] should just be committed to the job [maternal and child nutrition health care]. Once they [CHOs] are committed to the job, they [CHOs] can do better. We [CHOs] shouldn’t wait for somebody to motivate us in cash or kind before. Already the Government has motivated you [CHOs], so whatever you [CHOs] receive at the end of the month should be enough to motivate you [CHOs]. So generally, I think everything is just about commitment, yes if we all take it [maternal and child nutrition healthcare] up as a serious challenge, we can all make a difference [improve maternal and child nutrition]...The little support that we have we can give, we can even use our own motorbikes to render the services.”*

#### **4.5.4. Strategies for MHMT to improve maternal and child nutrition healthcare in CHPS zones**

The qualitative data set obtained from health staff through in-depth interviews about strategies for the municipal health management team (MHMT) to improve maternal and child nutrition services revealed five (5) main themes. The themes include; (i) provision of adequate resources for the delivery of maternal and child nutrition healthcare services in CHPS zones; (ii) effective supervisory monitoring and supportive visits of MHMT to all CHPS zones; (iii) motivation of CHOs in CHPS zones; (iv) regular staff training on maternal and child nutrition; (v) effective

involvement of MHMT staff in nutrition and health education activities in CHPS zones and (vi) financial support to maternal and child nutrition healthcare services in CHPS zones.

Participants believed that if the MHMT does effective supervisory monitoring and supportive visits to CHPS zones, it would improve maternal and child nutrition healthcare services in CHPS zones and ultimately improve maternal and child nutrition outcomes. Participants also reported that the municipal health management team need to ensure that adequate resources are provided in CHPS zones to ensure effective maternal and child nutrition healthcare services delivery in CHPS zones. The respondents also reported that the MHMT need to institute some motivation and incentives schemes for CHOs as they are located in very deprived areas in CHPS zones. Participants believed that incentives will boost the interest of CHOs to deliver effective maternal and child nutrition healthcare services. The themes from the qualitative data set obtained from respondents are presented below.

#### **4.5.4.1. Provision of adequate resources for the delivery of maternal and child nutrition health care services in CHPS zones**

An example of extracts from study participants about the need for MHMT to provide adequate resources for the delivery of maternal and child nutrition healthcare services in CHPS zones is illustrated below.

*“In my CHPS zone here, we don’t have maternal and child health record books” and then Vitamin A. As at now, Vitamin A red and blue are not there. The other thing [challenge] is our transport. We have weak motorbike here that has been lying down for over two years. We are using our personal motorbikes to run the services. So had it been that we don’t have [personal motorbike], all these that am talking to you about you can’t even see figures [nutrition data]..... The district [MHMT] need to take-up child health promotion and other programs that support child health and nutrition seriously. They [MHMT] should make sure that the logistics for such exercises are provided for the work to be done.”*





#### **4.5.4.2. Effective supervisory monitoring and supportive visits of MHMT to all CHPS zones**

An example of extracts from study participants about the need for effective supervisory monitoring and supportive visits by MHMT to all CHPS zones is illustrated below.

*“The district should do regular supportive visits to the CHPS zones. They [MHMT] should make themselves available to all CHPS compounds and not selective ones, most especially to those [CHPS zones] they [MHMT] think are not performing.....Effective supervisory monitoring of MHMT staff to various CHPS zones so that they [MHMT] will see what they [CHOs] are doing and add their [MHMT] voice. But when a nurse [CHO] is at the community [CHPS zone] and you don’t visit, they [CHOs] don’t do anything [provide services], the person [CHO] too will relax.”*

#### **4.5.4.3. Motivation of CHOs in CHPS zones**

An example of extracts from study participants about the need for MHMT to motivate CHOs in CHPS zones is illustrated below.

*“Those CHOs that are at the interior [rural communities], the MHMT should give them some incentives. Even if not giving them anything at all but they [MHMT] should approve their study leave request. That will motivate CHOs to also feel like being in the CHPS compound you [CHOs] are not wasting your time there..... They [MHMT] should motivate the staff [CHOs] for the little contribution just to ginger [cheer up] them [CHOs] to do the work.”*

#### **4.5.4.4. Regular staff training on maternal and child nutrition**

An example of extracts from study participants about the need for regular staff training on maternal and child nutrition by the MHMT is illustrated below.

*“I think the district should organize training especially on maternal and child nutrition because most CHOs are not trained on maternal and child nutrition. The people [communities] are very ignorant on maternal and child nutrition issues.....Capacity building for the staff because if they don’t know what goes into maternal and child health and nutrition, how do they work?.....Some of them [Health staff], the training they received on nutrition programs it’s been a very long time.....More staff should be trained on maternal and child nutrition, because most of the staff we only do this [provide nutrition services] by the job training.”*

#### **4.5.4.5. Effective involvement of MHMT staff in nutrition and health education activities in CHPS zones**

An example of extracts from study participants about the need for effective involvement of MHMT staff in nutrition and health education activities in CHPS zones is illustrated below.

*“The Nutritionist at the MHMT should be involved in those [nutrition activities] activities because they know more. So, they [Nutrition officers] should come to the CHPS zones and conduct nutrition education. Proper education should be done in CHPS zones....The district can organize food demonstration for the mothers in the various communities [CHPS zones]. When they [MHMT] do that, most mothers learn a lot from the combination of foods that they [MHMT] do. So if they [MHMT] do that frequently, most mothers will pick up [know nutrition issues] from there.”*



#### 4.5.4.6. Effective financial support to maternal and child nutrition healthcare services

An example of extracts from study participants about the need for effective financial support to maternal and child nutrition healthcare services is illustrated below.

*“Nutrition like this we used to carry out a whole lot of activities but now we can’t do them, there is no money.....The district [MHMT] should give monthly stipends to CHPS zones. At least monthly stipends and impress from the mother sub-district account. As at now, there is no monthly impress for us [CHOs]. They [MHMT] shouldn’t be depending on only the maternal and child health and nutrition improvement project (MCHPS) fund. Where the fund is available, it should be fast released so that CHOs at that level can run their activities.....As at now we are still picking last year last quarter fund. So it means the activities [health and nutrition services] were done before the money. So what is of use getting the money as at now?”*





## CHAPTER FIVE

### DISCUSSION

#### 5.0. Introduction

This chapter presents the discussion of the study results by comparing the study findings with the findings in the scientific literature. The purpose of this study was to determine the extent to which CHPS implementation benefit maternal and child nutrition in CHPS zones. The indicators that were used to assess the performance of CHPS in relation to maternal and child nutrition healthcare services delivery include training/capacity-building for CHPS health staff to provide maternal and child nutrition healthcare services; availability of protocols/working guidelines for the provision of maternal and child nutrition healthcare services, availability of essential medicines for maternal and child nutrition healthcare services, availability of logistics/equipment and availability of maternal and child nutrition services in CHPS zones. The overall performance of CHPS in relation to maternal and child nutrition healthcare was determined based on CHPS performance in the selected performance indicators. The main independent variable in the study was CHPS performance in maternal and child nutrition while the main dependent variables in the study for children were minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD). Maternal household food consumption score (FCS) was used as a proxy outcome indicator to infer maternal nutrition at the household level.



### **5.1. CHPS performance indicators in relation to maternal and child nutrition healthcare services delivery**

The results of the study suggest that about half of the CHPS compounds in Jirapa municipality do not have inadequate logistics/equipment for the provision of maternal and child nutrition healthcare services in CHPS zones. The findings of the study also revealed that of the total CHPS compounds visited in the course of the study, more than a quarter did not have adequate training/capacity building for the staff in these CHPS compounds. In terms of availability and use of recommended protocols and working guidelines, a little more than half of the CHPS compounds had adequate available working guidelines/protocols. Regarding availability of essential medicines for health care services delivery in relation to maternal and child nutrition healthcare, the findings again point to only about a little more than half of the CHPS compounds recorded adequate available stock for selected essential maternal and child health medicines. It was realized that close to half of the CHPS compounds did not provide adequate maternal and child nutrition healthcare services in CHPS zones. The findings in this study about CHPS performance in relation to maternal and child nutrition healthcare services delivery in CHPS zones are consistent with the observations of Ayuk, (2018) and Yeboah & Kissiwah (2017) who reported that, “inadequate training facilities”, “poor logistics”, “few teaching and learning materials for educating mothers” are barriers which affect access to nutrition healthcare services especially in rural setting. The study findings also relate with the observation of Bhutta (2017) that barriers to healthcare access and equitable care in community-based settings are related to “lack of trained human resources for health” and “poorly functional health systems”.



Though the performance of most CHPS facilities is found to be inadequate in relation to maternal and child nutrition healthcare services delivery, the reason for the inadequate performance of CHPS compounds may not be attributed to lack of commitment to services delivery on the part of community health officers (CHOs). The findings from the study suggest that CHOs in CHPS zones demonstrate some level of commitment towards maternal and child nutrition healthcare services delivery. The evidence show that all the mothers interviewed agreed that they receive nutrition counselling during ANC services. Again, almost all the mothers responded as having ever been weighed at an antenatal service point. These suggest that CHOs living in CHPS compounds are committed in some way to delivering maternal and child nutrition healthcare services in CHPS zones. Notwithstanding any commitment from CHOs to nutrition healthcare services delivery, the overall performance of CHPS facilities in maternal and child nutrition healthcare services delivery however is limited by inadequate availability of logistics, equipment and supplies for delivery of maternal and child nutrition healthcare services in CHPS zones.

## **5.2. Prevalence of maternal and child feeding indicators**

Evidence from this study revealed that a little over a quarter of the households had a poor food consumption score. In households with children aged 6 to 23 months, children who met the requirement of a minimum meal frequency constituted about three quarters, whereas a little more than a quarter could not meet the requirement of the minimum meal frequency. In terms of meeting the recommended dietary diversity for the same group of children, more than three quarters of the children again met the requirement and a little over half of the children attained the requirement for a minimum acceptable diet. The results from the study show high scores for child feeding indicators and suggest that majority of children aged 6-23 months in the study area



meet the WHO recommended feeding standard for minimum dietary diversity, minimum meal frequency and minimum acceptable diet. The findings from the study are similar with observations in the district of Rupandehi in Western Nepal, where minimum meal frequency was relatively high among children (Gautam et al., 2016). High dietary diversity score was also reported in Nigeria (Ajani, 2010) as well as the observations of Issaka et al., (2014) where a little over half of children aged 6-23 months met the minimum dietary diversity.

The study findings on child feeding indicators is however different from other observations (Ajani, 2010; Ickes et al., 2017; Gautam, Adhikari, Khatri, & Devkota, 2016; Gewa & Leslie, 2015; Issaka et al., 2014; Mercy Sosanya, Ayodele Gbemileke, Jeanne Freeland-Graves, n.d.) where evidence of low scores for minimum meal frequency, minimum dietary diversity and minimum acceptable were reported for children aged 6-23 months. These variations in the findings may be explained by differences in sample size.

The fact that some children still do not meet the WHO recommended standard for child feeding may explain the prevalence of malnutrition among children. It has been shown that suboptimal complementary feeding practices especially in the first years of life have a “detrimental impact on a child’s growth, health and development” (Issaka et al., 2015). They lead to malnutrition among children and contribute to the “high prevalence of stunting and underweight reported for children <5 years of age in Sub-Saharan Africa” (Issaka et al., 2015). Malnutrition has been shown to have debilitating effect on mothers and children alike and is a “major predisposing factor for morbidity and mortality” among pregnant women, lactating women and infants and young children (Lartey, 2008; WHO, 2013). Therefore, efforts towards improving minimum meal frequency, minimum dietary diversity and minimum acceptable diet among children in CHPS zones may contribute to reducing the prevalence of malnutrition among children.

### 5.3. Factors associated with maternal and child feeding indicators

The analysis of the study data returned values with statistically significant p-values for education level of mothers, ethnicity of mothers, occupation of mothers, age of child, child feeding advice from family members, presence of cultural values or believes forbidding children from consuming certain foods, household decision-maker regarding food purchases and CHPS performance as factors which presented significant statistical relationship with household food consumption score (FCS). The results demonstrate that the proportion of households with high food consumption score increases significantly with increasing educational level of mothers. The higher a mother's educational level, the more likely their household would have higher food consumption score. This observation is similar to reports presented that household-level factors such as educational level influence maternal nutrition (Gewa & Leslie, 2015; Harris-fry et al., 2017; Reinbott & Jordan, 2016). The result suggests that interventions which target female education may contribute to improving maternal feeding practices at the household level. Compared to mothers with informal occupation, those with formal occupation were favored to have an acceptable household food consumption score. This again suggest that maternal education influences household food consumption since the mothers who have formal occupation have formal education too.

Also, compared to children aged <6 months, 12-23 months and 24+ months age brackets, households with an acceptable food consumption score were more likely to have children who belong to the age bracket of 6-11 months. In households where mothers take decision about food purchases, more than three quarters were more likely to make borderline food consumption score compared to half or a little above half for households where husband/partner take food purchase decision, where mother/caregiver and father together take food purchase decision, where elderly





person in household/family take food purchase decision and where mother/caregiver together with the elderly person in the household take food purchase decision. It was also quite revealing that the households under the catchment area of low-performing CHPS facilities significantly scored a poor food consumption score compared to households within the catchment area of high-performing CHPS compounds. This finding suggests that nutrition healthcare activities in CHPS zones may have some beneficial effect at the household level in terms of food consumption score. Since household food consumption score is a proxy measure of household food security and nutrient and energy sufficiency, it could infer that nutrition healthcare activities in CHPS zones may likely contribute to maternal dietary practices at the household level in CHPS zones.

Regarding minimum dietary diversity, the study findings revealed that more children whose mothers received dietary advices from family members regarding maternal and child feeding met their minimum dietary diversity compared to children of mothers who did not receive dietary advices from family members. This suggest that family members may have some effect on feeding outcomes of children. As such, nutrition health education interventions which target all household members and not only mothers may have a beneficial effect regarding child feeding practices at the household. Relative to poor and borderline household food consumption scores, much higher proportion of children belonging to households with acceptable food consumption scores met their minimum dietary diversity. This suggest that if households are food secured, most children would likely meet the recommended child feeding practices. This observation in the study is consistent with the observation of Harris-fry et al, (2017) who reported that food security at the household-level determine maternal and child nutrition. Hence, interventions which focus on ensuring the availability and access to food by households may have potential



beneficial effect on child feeding indicators and nutritional outcomes. Though CHPS performance in maternal and child nutrition healthcare was noted to have some beneficial influence at the household level in terms of household food consumption score, there was no observed statistically significant effect with child minimum dietary diversity score. This may be due to the healthcare delivery strategies which CHPS staff employ to deliver social behavior change health messages. The CHOs may have focused more on using only some healthcare services delivery strategies such as the use of community durbars and mother-to-mother support groups only as platforms to deliver nutrition behavior change communication messages. These strategies though producing some results, they seem to have more positive association at the household level in terms of the household food consumption but not child feeding indicators. Since the evidence shows that advice from household members influence child feeding indicators, CHPS staff may consider a shift to adopting and or intensifying the use of household-to-household nutrition education approach and treating each household as a unit in delivering nutrition health messages especially when targeting to improve on child feeding indicators. Though almost every mother reported that they have ever received nutrition education and counselling at ANC and maternal nutrition related knowledge is also relatively high among respondents, these did not have any statistically significant association with child minimum dietary diversity, minimum meal frequency and minimum acceptable diet. This suggests that efforts focusing on improving the nutrition knowledge of mothers only may have little to no effect especially when targeting to improve child feeding indicators. Maternal and child nutrition education focusing on the households may be a viable alternative towards improving child feeding indicators in CHPS zones.



Again, in terms of minimum acceptable diet, occupation of respondents, age of child, received dietary advice from family members regarding maternal and child feeding, household food consumption score, minimum meal frequency, and minimum dietary diversity were significantly associated with minimum acceptable diet. These results are similar to the observations in the work of; Oddo & Ickes (2018); Issaka et al. (2014); Reinbott & Jordan (2016); Harris-fry et al. (2017); Gewa & Leslie (2015) and Khan et al. (2017). The study findings show that about half of children of respondents with informal occupation did not meet their minimum acceptable diet compared to less than a quarter for children of mothers with formal occupations and children belonging to mothers with other occupations. It has been reported that “children of both formally and informally employed women, compared to children of non-employed women, had higher odds of meeting minimum dietary diversity (MDD)” and minimum meal frequency (MMF) (Oddo & Ickes, 2018). In terms of age of the children, the study results suggest that older children are more likely not to meet their requirement for minimum acceptable diet. This observation contradict some studies ( Issaka et al., 2015; Reinbott & Jordan, 2016) which reported that the older the child, the more diverse the child’s diet or the more likely the child would have adequate dietary intake.

The study finding again revealed that increase in household food consumption score is significantly associated with minimum acceptable diet. Compared to mothers who did not received dietary advices from family members about maternal and child feeding, a little more than half of mothers who received dietary advice from family members regarding maternal and child feeding had children who met the minimum acceptable diet. This again suggest that family members have some important contribution to child feeding indicators. Therefore, nutrition education focusing on family members towards improving child complementary feeding



practices may serve as a great opportunity for improving child feeding and nutritional outcomes in CHPS zones. Again, it was realized that among children who met their minimum meal frequency, less than a quarter were likely not to meet their minimum acceptable diet compared to a sure likelihood of not meeting the minimum acceptable diet for all children who did not meet the minimum meal frequency. Mother's nutritional knowledge did not influence consumption of minimum acceptable diet among children. This may be explained by the effect of household members' dietary advices on child feeding practices of mothers/caregivers. The findings of this study also suggest that increasing nutrition knowledge of mothers only may not have substantial positive effect in improving minimum acceptable diet score among children in CHPS zones. A more beneficial approach maybe to focus nutrition education on the household members towards improving child feeding indicators. However, Issaka et al., (2014) reported that risk factors for inadequate complementary feeding practices include mothers not attending postnatal, implying that maternal nutrition knowledge obtained during postnatal visits have some positive effect on complementary feeding practices.

After controlling for confounding for all statistically significant variables using regression analysis, the study results revealed that ethnicity, age of child and dietary advice from family members regarding maternal and child feeding are determinants of household food consumption score in CHPS zones. Households with Dagaaba ethnicity had low likelihood of having an acceptable household food consumption score compared to other ethnicities. This may be attributed to some extraneous cultural values or beliefs among the Dagaaba ethnicity about food consumption. It may also be as a result of male dominance in household food purchase decision among the Dagaaba ethnicity and as a result, overshadowing the beneficial effect experienced in households where women take household food purchase decision as revealed in the study. The



work of Harris-fry et al. (2017) revealed that household-level determinants of maternal and child nutrition include ethnicity. Further, households with mothers who receive dietary advice from family members regarding maternal and child feeding have less than a quarter chance of having an acceptable household food consumption score. This suggest that, household members' dietary advices on maternal and child feeding contribute significantly to inadequate dietary intakes at the household level. This may be due to inappropriate dietary advices by household members. Therefore, interventions which target mitigating the negative effect of household members' dietary advices on dietary practices through social behavior change communication may have substantial positive effect on improving dietary practices at the household level and contributing to improving maternal and child feeding outcomes. The study finding also points to a fact that households with children within the age bracket of 6 to 11 months have increased odds of having an acceptable household food consumption score. Households with children 6-11 months old have four and half times the odds of recording an acceptable household food consumption score. Households with children aged 12-23 months have about three times the odds of recording acceptable food consumption score, while households with children aged 24months and above have only about one and half odds of recording an acceptable food consumption. These results suggest that households with children 6-11 months are more likely to be food secured compared to households with older children. It further suggests that, the older the child, the less likely that a household will record an acceptable food consumption score. These results also suggest that, mothers/caregivers care more (focus more) on ensuring that food is available in the household for meeting the feeding and nutritional requirements of mothers with younger children than their older counterparts.



Compared to the observations in the work of Reinbott & Jordan, (2016); Gewa & Leslie, (2015); Oddo & Ickes, (2018), only household food consumption score is found in the study as a determinant of minimum dietary diversity score among children. The study results demonstrate that an increase in household food consumption score significantly predict meeting minimum dietary diversity score of children in CHPS zones. Children from households with an acceptable food consumption score were ten times more likely to meeting their minimum dietary diversity compared to children from households with a poor food consumption score. This important finding suggests that food security at the household level may contribute substantially to meeting dietary requirement and nutritional needs of children. Therefore, food insecurity may be a serious risk factor to meeting the minimum dietary diversity among children. Consequently, measures to improve availability, economic and social access to nutritious foods may substantially improve child dietary diversity score and ultimately improving nutritional status of children.

Again, after controlling for confounding, the regression model showed that predictors of minimum acceptable diet are; age of child, dietary advice from family members regarding maternal and child feeding, household food consumption score, and CHPS performance in maternal and child nutrition healthcare. The study found that as children aged, their likelihood of meeting their minimum acceptable diet decreases. This observation is different with an observation which reported that adequacy of diet intake for children only improved with increasing age and that children from the youngest age bracket (6-11 months) were at risk of inadequate dietary intake (Issaka et al., 2015). Again, the finding is different from the observations of Reinbott & Jordan, (2016) who reported that the older the child, the more diverse the child's diet". In this study, older children have less chance of meeting their minimum



acceptable diet requirement compared to younger children between the ages of 6-11 months old. This suggest that there may be reduced care practices for older children on the part of mothers/caregivers of children in CHPS zones. It also implies that in the complementary feeding period, most children (12 months and above) have reduced chances of meeting their feeding and nutritional requirements in at the household level. This may partly be due to reduced care practices or reduced household food availability and or reduced access by mothers with older children to food at the household level. Such a situation may expose children aged 12 months and above to various forms of undernutrition and consequently exposing the children to various forms of morbidities and mortalities. The World Health Organization underscore the importance of the first 1000days of life and describe it as a “window of opportunity” within which when intervened can prevent, possibly reverse and or reduce substantially the proportion of malnutrition among children. This first 1000days of life also include children aged 12-23 months. Hence the likely reduced care practices of mothers/caregivers in CHPS zones for children within 12-23 months’ age group is a risk to child nutrition security. Therefore, nutrition health messages which emphasizes appropriate complementary feeding practices by caregivers may have positive effect on child feeding and nutrition outcomes in CHPS zones.

Throughout the results, the effect of family members (household members) on maternal and child feeding indicators have been shown to be highly substantial. Children whose mothers receive dietary advice from family members regarding maternal and child feeding have far less than half chance of meeting their minimum acceptable diet compared to children whose mothers do not receive dietary advice from family members regarding maternal and child feeding. This underscore the need to direct targeted attention on household members as a unit in order to improve on child feeding practices and mothers alike. Households (family) members may



provide suboptimal dietary advices to mothers/caregivers. Therefore, social behavior change communication health messages directed at mitigating the rather negative effect of family members' dietary advices on maternal and child feeding practices and nutrition and health outcomes may have dramatic improvement in maternal and child dietary practices and nutritional outcomes. This is more so because the evidence revealed from the study show that only household food consumption score predicts dietary diversity among children. Yet household food consumption score is strongly predicted by dietary advices from family members about maternal and child feeding while household food consumption score and dietary advice from family members on maternal and child feeding also predict minimum acceptable diet score. Hence the impact of family members on maternal and child feeding outcomes cannot be over emphasized. Increase in household food consumption score strongly predict meeting the requirement for minimum acceptable diet. Relative to households with poor score for household food consumption, children in households with borderline food consumption score have more than double the odds of meeting their minimum acceptable diet. More so, children from households with acceptable food consumption score are even more likely to meet their minimum acceptable diet by more than twenty-three fold odds compared to children from households with a poor food consumption score.

The evidence further show that children from households under high-performing CHPS facilities have only about less than half chance of meeting their minimum acceptable diet compared to those children from households under low-performing CHPS. This implies that even where CHPS are adequately performing in terms of maternal and child nutrition healthcare services delivery, the chance of children meeting the minimum acceptable diet is low compared to those children from households under low-performing CHPS. The results imply that CHPS

performance is not a very strong predictor of minimum acceptable diet score of children. This may be explained by negative effects of household members' dietary advices on maternal and child feeding. It may also be attributed to suboptimal household food consumption score. These have been shown in the study to be strong predictors of minimum acceptable diet. Perhaps, most households in the high-performing CHPS zones are also food in-secured. Hence, though CHPS staff may have been delivering appropriate maternal and child nutrition behavior change communication messages about optimal feeding for mothers and children, this may not result in the desired outcome due to lack or inadequate access to the required food.

#### **5.4. Strategies to strengthen CHPS health care services delivery and improve maternal and child nutrition health promotion activities in CHPS zones**

Some of the dominant themes that were identified from the in-depth interviews with community health officers and staff of the Jirapa municipal health management team about strategies to strengthen health care services delivery and improve maternal and child nutrition health promotion activities in CHPS zones includes; provision of adequate logistics for services; regular training of community health officers, motivation of community health officers, proper planning for maternal and child nutrition health care services; effective home-visits; proper community engagement on maternal and child nutrition healthcare services; effective supervisory monitoring and supportive visits by the municipal health administration to all CHPS zones and effective financial support for maternal and child nutrition healthcare services in CHPS zones. Most of the strategies that were identified are consistent with existing strategies documented in the literature. For example, most participants believed that CHPS zones need to be strengthened with adequate logistics for provision of maternal and child nutrition health care services.



Participants reported, *“In my CHPS zone here, we don’t have maternal and child health record books” and then Vitamin A. As at now, Vitamin A red and blue are not there. ....The other thing is our transport. We have weak motorbike here that has been lying down for over two years.....They should make sure that the logistics for such exercises are provided for the work to be done.”* These findings confirm reported evidence in the literature that, CHPS strategy implementation encountered various challenges such as equipment and logistics for operations at CHPS level (PRIMASYS, 2017). Studies observed that there was shortage of commodities such as essentials medicine in some CHPS zones (Wiru et al., 2017). In both the Western and Central regions of Ghana, an assessment report revealed that “CHPS compounds” were partially equipped (MoH, 2014).The evidence shows that community health workers lack consistent supplies for service delivery (Seutloali et al., 1986). Similarly, Bhutta & Black (2013) reported that, in primary health care setting such as CHPS zones, the key challenges to effective program implementation are “lack of adequate supplies” and “frequent depletion of necessary stock” (Bhutta & Black, 2013). These findings suggest that primary health care settings such as CHPS zones need to be adequately resourced to improve primary health care services delivery including the provision of optimal maternal and child nutrition health care in CHPS zones.

Also, majority of the participants were of the view that community health officers (CHOs) or community health workers need to receive regular training in maternal and child nutrition. *“I think the district should organize regular training especially on maternal and child nutrition because most CHOs are not trained on maternal and child nutrition. If they don’t know what goes into maternal and child health and nutrition, how do they work?”*. This extract from the participants underscores the need for regular training of community health officers in relation to maternal and child nutrition health care. It has been documented that, in general, challenges



regarding CHPS implementation related to issues of manpower numbers, training and service capacity of community health officers (Awoonor-Williams et al., 2013). Bhutta & Black (2013) reported that community-health-worker programs depend on “training of health workforce” (Bhutta & Black, 2013). Motivation of community health officers and community health volunteers was also identified as an important strategy to improve maternal and child nutrition health care services in CHPS zones. *“They [community health officers] need motivation so that they will be able to do their work. Motivation can be anything at all, either money or any other thing.....If you don’t motivate them, they will not do the work.”* Available evidence shows that community health workers “lack consistent financial incentives and are overwhelmed with “work overload” (Seutloali et al., 1986). Other evidence shows that “there is no policy on reward and incentives” for community health volunteers leading to “volunteer fatigue” (Awoonor-williams et al., 2004; CHPS Policy, 2016). Hence, the “volunteer system” is distorted in several communities (Awoonor-williams et al., 2004). For “equitable access of all vulnerable women and children to both curative and preventive services” including maternal and child nutrition health care services, the role of community health workers cannot be over emphasized (MOH, 2014).

Participants also reported that proper planning for maternal and child nutrition activities in CHPS zones is necessary for improving maternal and child nutrition health promotion activities in CHPS zones. Participants believed that if CHOs include maternal and child nutrition health promotion activities in their routine schedule, maternal and child nutrition health promotion activities will most likely be mainstreamed in CHPS zones. Also the participants mentioned that home-visits by community health officers (CHOs) play a very important role in improving maternal and child nutrition in CHPS zones. Participants believed that through home-visits,





CHOs could have the opportunity to have one-on-one interaction with mothers, caregivers and family members which serves as a good platform to address specific nutrition issues at the household level. *“The CHOs should do weekly home-visits on education concerning nutrition to the mothers at home. And do individual counseling for nursing mothers and pregnant women..... We can educate them more by moving from house-to-house, going closer to the people...I think home visiting will strengthen maternal and child nutrition health promotion.”*

This strategy as evidenced in the study has been established in literature. For example, a systematic review of both randomized and non-randomized controlled studies in nutrition reported significant statistical findings which showed that undernutrition can be successfully addressed in the community with community health workers visiting households regularly to provide health and nutrition education and regular child growth monitoring in the community (Freeman et al., 2017). Robust evidence from Bangladesh revealed that application of “community-based approaches”, especially investing in “community health workers” to use “doorstep delivery approach” improved “equitable access of all vulnerable women and children to both curative and preventive services” (El Arifeen et al., 2013). Effective child health interventions includes “promotion of healthy household behaviors and appropriate utilization of health services” (Perry et al., 2017).

Participants believed that proper engagement with community members would also help improve maternal and child nutrition health care activities in CHPS zones. Participants were of the view that regular meeting with community support-groups such as mother-to-mother support-groups and organizing community durbar to sensitize community members on maternal and child nutrition issues among others are important strategies to improve maternal and child nutrition health promotion in CHPS zones. The respondents reported that by having regular engagement



with community and educating them on maternal and child nutrition, it would help improve on optimal maternal and child nutrition practices in the communities. *“I think we have to hold monthly meetings to educate the community through our durbars and through the child welfare clinic....We [CHOs] should conduct durbars and educate them [community members] on all these [maternal and child nutrition].”* The WHO case series on primary health care across countries shows that primary health care “flourished when implemented with meaningful community engagement” (WHO, 2018). Systematic reviews of randomized controlled trials demonstrate important evidence that by supporting “community-level workers” and “engaging communities”, major causes of mortalities among children in poor settings such as CHPS zones can be addressed at the community level (Freeman et al., 2017).

Another important theme which emerged across the data set was effective financial support for maternal and child nutrition health care services in CHPS zones. Most respondents believed that maternal and child nutrition health care services could be improved through effective financial support for maternal and child nutrition health care activities in CHPS zones. *“Nutrition like this we used to carry out a whole lot of activities but now we can’t do them, there is no money.....The district should give monthly stipends to CHPS zones. As at now, there is no monthly impress for us [CHOs]. Where the fund is available, it should be fast released so that CHOs at that level can run their activities [maternal and child nutrition healthcare]”* This finding is founded in existing literature. It has been reported that CHPS strategy implementation is challenged with absence of dedicated funding for operations at CHPS level (PRIMASYS, 2017). The “absence of a budget line item for CHPS”, resulted in inadequate resources and a lack of focus about CHPS program (Awoonor-Williams et al., 2013). Evidence in both the Western and Central regions revealed that “CHPS compounds” lacked “operations running budget”

(MoH, 2014). The strategies which have been shown to improve health outcomes in rural health care settings among others include “reduction of financial barriers” in health care services delivery (Chopra et al., 2012). These evidences suggest that CHPS zones may need adequate financial support to help deliver adequate maternal and child nutrition health care services in CHPS zones.



## CHAPTER SIX

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.0. Introduction

This chapter presents conclusions drawn from the study based on the findings obtained from the study results. The chapter also presents recommendations made based on the evidences presented in the study for improving maternal and child nutrition health care in CHPS zones.

#### 6.1. Conclusions

CHPS is an intervention for improving maternal and child nutrition, however, the performance of most CHPS zones in maternal and child nutrition healthcare services delivery is inadequate. Most CHPS zones are inadequately resourced for maternal and child nutrition health care services delivery. Less than a quarter of households in CHPS zones have acceptable household food consumption score while a little over half of children in CHPS zones have the minimum acceptable diet.

The performance of CHPS zones on maternal and child nutrition indicators is associated with household food consumption score and minimum acceptable diet of children. Household food consumption score in CHPS zones is strongly predicted by dietary advices from family members on maternal and child feeding while household food consumption score, dietary advices from family members and CHPS performance are predictors of minimum acceptable diet score of children in CHPS zones. A well-resourced and well-motivated cadre of community health officers and community health volunteers can substantially improve maternal and child nutrition outcomes in CHPS zones. The health care system in CHPS zones needs to be strengthened through provision of adequate resources, regular training of community health officers (CHOs) on maternal and child nutrition and motivation of community health officers in CHPS zones.



## 6.2. Recommendations

Based on the evidenced presented from the study, the following recommendations are made to help mainstream maternal and child nutrition healthcare services delivery in CHPS zones.

The municipal health administration should strengthen the supply of equipment, logistics and essential maternal and child medicines in CHPS zones for adequate maternal and child nutrition healthcare services delivery. Also, the municipal health administration should give regular training to all community health officers in CHPS zones on maternal and child nutrition to improve on maternal and child nutrition healthcare services in CHPS zones.

Community health officers (CHOs) in CHPS zones should adopt and or intensify the use of household-to-household nutrition education approach and treat each household as a unit by delivering nutrition health messages to every individual in the household especially when targeting to improving on maternal and child feeding indicators.

The municipal health administration should institute motivation and incentives schemes for community health officers and community health volunteers to improve on maternal and child nutrition healthcare promotion activities in CHPS.

Future research on maternal and child nutrition in CHPS zones should focus on what processes are involved in the designed and implementation of maternal and child nutrition programs and interventions in CHPS zones.



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**APPENDICES**

**QUESTIONNAIRE FOR CHPS ON MATERNAL AND CHILD NUTRITION**

**Health Workforce**

1. Please tell me how many staff with each of the following qualifications are currently assigned to this CHPS zone?

- a. Community Health Nurse
- b. Enrolled Nurse
- c. Midwife
- d. Other (specify).....

2. Have you or any provider (s) in this CHPS zone received training in the last two years in the following areas?

	(Yes)	(No)
a. Any PMTCT training in the last two years?		
b. Any training in infant and young child feeding in the last two years?		
c. Any training in Kangaroo mother care in the last two years?		
d. Any ANC training in the last two years?		
e. Any training in IPTp in the last two years?		
f. Any training in maternal and child nutrition in last two years?		
g. Any training in CMAM in last two years?		
h. Any training in nutritional status assessment in last two years?		
i. Any training in growth monitoring in last two years?		

- 3. Do you have volunteers under this CHPS zone/community? Yes/No
- 2. How many volunteers are under this CHPS community?.....
- 3. Have volunteers under the CHPS zone received any training on the CHPS strategy? Yes/No
- 4. Have volunteers under the CHPS received any training/orientation on maternal and child nutrition? Yes/No



5. Who selects the volunteers for the CHPS community? (*select only ONE option*)  
(a) The District health team (b) The Sub-district health team (c) The CHPS staff (d) The Community (e) Don't Know
6. Who train the volunteers under this CHPS community?  
(a) The District health team (b) The Sub-district health team (c) The CHPS staff (d) Don't Know

**Supervision, monitoring and evaluation**

7. Do you have an annual plan in this CHPS zone for the promotion of maternal and child nutrition services? Yes/ No/ Don't Know
8. Does the MHMT organize performance reviews for this CHPS zone? Yes/ No/ Don't Know
9. How often do MHMT organize performance reviews? Monthly/quarterly/annually
10. Is there any policy and incentives scheme to reward CHO serving in CHPS zones in this district/municipality? Yes/No
11. Is there any comprehensive policy/plan for CHO in CHPS zones who desire to continue their education? Yes/No
12. At least, how long should a CHO remain in CHPS zone before reposting?  
After 1 year (b) After 2years (c) After 3 years (d) After 4 years
13. Is there any policy on reward and incentives for volunteers? Yes/No
14. Do you have comprehensive policy/plan in this CHPS zone for the procurement of medicines, supplies and equipment? Yes /No/Don't Know
15. When was the last time this CHPS zone received a supervision visit from the higher level (MHMT or other)?
- a. This month
  - b. In the last 3 months
  - c. More than 3 months ago
  - d. Don't know

16. During the supervision visit, did the supervisor assess the following?

	Yes	No
a. Basic equipment, tools, supplies	<input type="checkbox"/>	<input type="checkbox"/>
b. Staffing (e.g. staff available and training)	<input type="checkbox"/>	<input type="checkbox"/>
c. Data (e.g. completeness, quality, and timely reporting)	<input type="checkbox"/>	<input type="checkbox"/>



17. Does the MHMT conduct surveys in this CHPS zone for obtaining client input on appropriate, timely and effective access to health services? Yes/ No/ Don't Know

**Essential medicines, equipment and supplies**

18. Please tell me if the following basic equipment and supplies used in the provision of client services are available and functional in this facility today ( <i>Ask to see</i> )		
	Available (Yes/No)	Functional (Yes/No)
a. Adult weighing scale		
b. Child weighing scale- 250 gram gradation		
c. Infant weighing scale – 100 gram gradation		
d. Motorbike		
e. Measuring tape-height board/stadiometre		
f. Growth charts		
g. HemoCue		
h. MUAC tapes		
i. Weighing pant		

19. Are any of the following maternal health medicines available in the facility today? (*check to see*)

**Yes      No**

- a. Iron tablets
- b. Folic acid tablets
- c. Iron and folic acid combined tablets

20. Are any of the following child health medicines available in the facility today?

**Yes      No**

- a. ORS sachets
- b. Zinc sulphate tablets
- c. Zinc sulphate syrup or dispersible tablets
- d. Vitamin A (retinol) capsules



21. Please tell me if the following guidelines/documents are available in the facility today (Ask to see):

	Yes	No
a. National guidelines for PMTCT	<input type="checkbox"/>	<input type="checkbox"/>
b. Guidelines for infant and young child feeding counseling	<input type="checkbox"/>	<input type="checkbox"/>
c. Any national guidelines for essential childbirth care	<input type="checkbox"/>	<input type="checkbox"/>
d. Any check-lists and/or job-aids for Essential childbirth care	<input type="checkbox"/>	<input type="checkbox"/>
e. Any national guidelines for essential newborn care	<input type="checkbox"/>	<input type="checkbox"/>
f. National guidelines for growth monitoring	<input type="checkbox"/>	<input type="checkbox"/>
g. ANC guidelines	<input type="checkbox"/>	<input type="checkbox"/>
h. Any ANC check-lists and/or job-aids	<input type="checkbox"/>	<input type="checkbox"/>
i. IPTp guidelines, check-lists and/or job-aids	<input type="checkbox"/>	<input type="checkbox"/>

22. Has there been stock-out of any of the following in the past 3 months?	Yes	No
a. Iron tablets		
b. Folic acid tablets		
c. Iron and folic acid combined tablets		
d. Zinc sulphate		
e. Zin sulphate syrup		
f. Vitamin A		
g. ORS		
h. Adult weighing scale		
i. Child weighing scale- 250 gram gradation		
j. Infant weighing scale – 100 gram gradation		
k. Measuring tape-height board/stadiometre		
l. Growth charts		
m. HemoCue		
n. Guidelines for infant and young child feeding counseling		
o. Child weighing scale		



22. Does this facility have a refrigerator available and functioning for the storage of vaccines?

- a. Available and functional
- b. Available not functional
- c. Available don't know if Functioning
- d. Not available

**Service delivery**

23. Does this facility (CHPS compound) offer antenatal care (ANC) services? Yes / No

24. Do you provide any of the following services to pregnant women as part of routine ANC services in this CHPS zone?

- |  | <b>Yes</b>               | <b>No</b>                |
|--|--------------------------|--------------------------|
| a. Iron supplementation  | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Folic acid supplementation  | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Intermittent preventive treatment in pregnancy (IPTp) for malaria | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Nutritional education and counseling for pregnancy                | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Infant and young child feeding education                          | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Haemoglobin testing   | <input type="checkbox"/> | <input type="checkbox"/> |

25. Please tell me if this facility provides the following services:

- |  | <b>Yes</b>               | <b>No</b>                |
|--|--------------------------|--------------------------|
| a. Diagnose and/or treat child malnutrition                | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Provide vitamin A supplementation                       | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Provide iron supplementation                            | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Provide ORS to children with diarrhoea                  | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Provide zinc supplementation to children with diarrhoea | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Child growth monitoring                                 | <input type="checkbox"/> | <input type="checkbox"/> |

26. Does this facility offer services for the prevention of mother-to-child transmission of HIV (PMTCT)? Yes/ No





27. As part of PMTCT services, please tell me if this facility provides the following services to clients:
- Provide HIV counselling and testing services to HIV positive pregnant women for PMTCT
  - Provide infant and young child feeding counselling for PMTCT
  - Provide nutritional counselling for HIV positive pregnant women and their infants for PMTCT
28. Does this facility offer delivery and/or newborn care services? Yes/ No
29. Please tell me if the following interventions are routinely carried out by providers of delivery services in this CHPS zone:
- Administration of oxytocin injection immediately after birth to all women for the prevention of post-partum haemorrhage? Yes/No
  - Immediate and exclusive breastfeeding? Yes/No
  - KMC (Kangaroo mother care) for premature/very small babies
30. Do you offer immunization services in this CHPS zone? Yes/No
31. How often does this facility offer routine full child immunization services at the facility?
- Daily
  - Weekly
  - Monthly
  - Quarterly
  - Other (specify)
32. How often does this facility offer routine full child immunization services as outreach?
- Daily
  - Weekly
  - Monthly
  - Quarterly
  - Other (specify)
33. Does this facility offer preventative and curative care services for children under 5? Yes/No

34. What strategies are often used to implement or deliver the nutrition specific intervention?

*(select all that apply) Yes/No*

a. implemented locally in homes by CHOs
b. implemented in defined community group (s)
c. implemented locally in homes by volunteers
d. implemented at the CHPS compound
e. Through Integrated management of childhood illnesses (IMCIs)
f. During Child health days
g. School-based delivery platforms
h. Other (specify).....

**Supply Chain**

35. Who is the principal person responsible for managing the ordering of supplies at the facility?

- a. Midwife
- b. Enrolled nurse
- c. Community Health Nurse
- d. Other (specify).....

36. Who is the main source/direct supplier of commodities to your facility?

- a. Regional medical stores
- b. Private sources
- c. NGO/Donors
- d. Other.....

37. How are your commodities from the main supplier delivered to this facility?

- a. Supplier delivers to the facility
- b. Facility must arrange delivery to the facility
- c. Other (specify).....

38. For the most recent order, how long did it take between ordering and receiving products?

- a. Less than 2 weeks
- b. 2 weeks to 1 month
- c. Between 1 and 2 months
- d. More than 2 months

39. What is the main source of fund for activities in this CHPS zone?

- a. Government NHIS Reimbursement
- b. Development partners contribution
- c. Contribution from benefactors and philanthropist

***Thank you for your time  
This is the end of the survey***





**QUESTIONNAIRE FOR MOTHERS ON MATERNAL AND CHILD  
NUTRITION**

**Socio-demographic data**

1. How old are you?.....
2. How many children do you have?.....
3. What is your tribe? (a.)Dagaare (b.)Waala (c.)Sissala (d.)Birifo ( e.) Other (specify).....
4. Is the baby/child a male or female? Male  Female
5. What is the age of the baby/child in months? .....months
6. What is the highest level of school you attended? None  Primary school  
Secondary school Tertiary
7. Do you have a health insurance card? Yes No
8. Are you a single parent? Yes No
9. What is your occupation, that is, what kind of work do you mainly do?  
Pettytrader  Peasant farmer  Office worker  Charcoal burner Education Healthcare  
 Other, specify.....

**Infant feeding (0-6months)**

1. What is the first food a newborn baby should receive? Only breastmilk  
Other Don't know
2. Have you heard about exclusive breastfeeding? Yes No
3. What does exclusive breastfeeding mean?  
Exclusive breastfeeding means that the infant gets only breastmilk and no  
other liquids or foods  Other  Don't know
4. How long should a baby receive nothing more than breastmilk?  
From birth to six months Other Don't know
5. How often should a baby younger than six months be breastfed or fed with  
breastmilk? On demand, whenever the baby wants  Other  Don't know



**Feeding young children (6-23)**

6. How long is it recommended that a woman breastfeeds her child?  
Six months or less  6–11 months  12–23 months  24 months and more (correct response)  Other  Don't know
7. At what age should babies start eating foods in addition to breastmilk?  
At six months  Other  Don't know

**Women nutrition during pregnancy and breastfeeding**

8. How should a pregnant woman eat in comparison with a non-pregnant woman to provide good nutrition to her baby and help him grow? *Please list four practices she should* do.....
- Eat more food (more energy); Eat more at each meal (eat more food each day) Or Eat more frequently (eat more times each day)
- Eat more protein-rich foods
- Eat more iron-rich foods
- Use iodized salt when preparing meals
- Other
- Don't know

9. How should a lactating woman eat in comparison with a non-lactating woman to be healthy and produce more breastmilk? *Please list four practices she should* do.....
- Eat more food (more energy); Eat more at each meal (eat more food each day) Or Eat more frequently (eat more times each day)
- Eat more protein-rich foods
- Eat more iron-rich foods
- Use iodized salt when preparing meals
- Other
- Don't know



10. Most women would benefit from two types of supplements, or tablets, during pregnancy. Which are they?

Iron supplements [ ] Folic acid supplements [ ] Other [ ] Don't know [ ]

11. What is the health benefit for taking folic acid supplements/tablets?

[ ] For normal development of the nervous system of the unborn baby (brain, spine and skull)

[ ] To prevent birth defects/abnormalities the nervous system of the unborn baby (brain, spine and skull)

[ ] Other

[ ] Don't know

### Household food consumption

12. In your household, who usually makes decisions about purchasing food?

- a. Mother/caregiver
- b. Husband/partner or other man in the household
- c. Mother/caregiver and father together
- d. Elder person in household/family
- e. Mother/caregiver together with the elder person
- f. Other person, specify

13. How many times did your household consume from the following food groups in the past 7 days (1 week)

Food Group	Number of times food group is consumed in the past 7 days (1 Week)
Main staples (e.g Grains, roots and tubers)	
Pulses ( e.g Legumes and nuts)	
Vegetables (Pumpkin, carrots, okro, cabbage, etc )	
Fruit (mangoes, papayas, orange etc)	
Meat/Fish	
Milk	
Sugar	
Oil	



**Dietary diversity**

14. Yesterday during the day or at night, did the baby eat: (*Read the food lists*)

Group	Food lists	No	Yes
<b>Group 1:</b> Grains, roots and tubers	Porridge, bread, rice, noodles or other foods made from grains		
	White potatoes, white yams, cassava or any other foods made from roots		
<b>Group 2:</b> Legumes and nuts	Any foods made from beans, peas, lentils, nuts or seeds		
<b>Group 3:</b> Dairy products	Infant formula, such as; SMA, lactogen NAN, etc [ <b>insert local examples</b> ]		How many times?.....
	Milk, such as tinned, powdered or fresh animal milk		How many times?.....
	Yogurt or drinking yogurt		How many times?.....
	Cheese or other dairy products		
<b>Group 4:</b> Flesh foods	Liver, kidney, heart or other organ meats		
	Any meat, such as beef, pork, lamb, goat, chicken or duck		
	Fresh or dried fish, shellfish or seafood		





<b>Group 5:</b> Eggs	Eggs		
<b>Group 6:</b> Vitamin A fruits and vegetables	Pumpkin, carrots, or sweet potatoes that are yellow or orange inside		
	Any dark green vegetables [ <b>insert local examples</b> ]		
	Ripe mangoes (fresh or dried [not green]), ripe papayas (fresh or dried), musk melon [ <b>insert other local vitamin-A-rich fruits</b> ]		
	Foods made with red palm oil, red palm nut or red palm nut pulp sauce		
<b>Group 7:</b> Other fruits and vegetables	Any other fruits or vegetables		
<b>Others</b> (not counted in the dietary diversity score)	Any sugary foods, such as chocolates, sweets, candies, pastries, cakes or biscuits		
	Condiments for flavour, such as chillies, spices, herbs or fish powder		

**Minimum meal frequency**

15. How many times did the baby eat food yesterday; that is meals and snacks other than liquids during the day or at night? Number of times [ ] Don't know [ ]
16. Can you afford to purchase any of the following foods? Yes [ ] No [ ]
- a. Milk
  - b. Fish
  - c. Chicken
  - d. Eggs
  - e. red meat
17. Do you receive dietary advice about your child or yourself from family members? Yes [ ] No [ ]

**Cultural values and beliefs**

18. Do your cultural values or beliefs forbid mothers from eating certain foods?  
Yes [ ] No [ ]
19. What food does your cultural values or beliefs forbid women from eating?

**Organ meat, egg and dairy products**

Liver [ ] Kidney [ ] Heart [ ] Beef [ ] Pork [ ] Lamb [ ] Egg [ ]  
Milk/dairy products [ ] Other [ ]

**Flesh meat and fish**

Goat [ ] Sheep [ ] Cow [ ] Rabbit [ ] Chicken [ ] Guinea fowl [ ] Duck [ ] Fish [ ] Dog/Peg  
[ ] Other [ ]

**Fruits and vegetables**

- Orange sweet potato [ ] Carrot [ ] Pumpkin [ ] Mango [ ] Papaya [ ] Watermelon [ ]  
Orange [ ] Banana [ ] Pineapple [ ] Other [ ]
20. Why does your culture forbid these foods? Not good for women health [ ]  
Don't know [ ] Other [ ]
21. Do your cultural values or beliefs forbid children from eating certain foods? Yes/No



22. What food does your cultural values or beliefs forbid children from eating?

**Organ meat, egg and dairy products**

Liver  Kidney  Heart  Beef  Pork  Lamb  Egg

Milk/dairy products  Other

**Flesh meat and fish**

Goat  Sheep  Cow  Rabbit  Chicken  Guinea fowl  Duck  Fish  Dog/Peg

Other

**Fruits and vegetables**

Orange sweet potato  Carrot  Pumpkin  Mango  Papaya  Watermelon

Orange  Banana  Pineapple  Other

23. Why does your culture forbid children from eating these foods?

Not good for child health  Don't know  Other

*Thank you for your time*

*This is the end of the survey*



## IN-DEPTH INTERVIEW GUIDE

### Measures to strengthen the health system for improved maternal and child nutrition healthcare services delivery in CHPS zone

1. What do you recommend to enable the community health volunteer contribute better towards improving maternal and child nutrition health promotion activities in the communities?
2. What do you recommend to enable the community health committee contribute better towards improved health services in the communities?
3. In what ways can the community health volunteer be made to contribute better for improved primary health care services delivery?
4. What measure should the district put in place to improve maternal and child nutrition health promotion activities in CHPS zones?
5. What ways could the community health officer (CHO) improve maternal and child nutrition healthcare services delivery activities in the CHPS zone?
6. What others measures will you recommend to improve maternal and child nutrition healthcare services delivery in the communities?
7. What do you recommend for the community health officers to put in place to improve maternal and child nutrition healthcare services in the communities?
8. What measures should the community health officer (CHO) put in place to improve maternal and child nutrition health services in the CHPS zones?
9. In general, what measures will you recommend to improve maternal and child nutrition healthcare services delivery in the CHPS zones in the Municipality?

*Thank you for your time. This is the end of the interview*

