COMPETENCY OF COMMUNITY HEALTH VOLUNTEERS ON COMPLEMENTARY FEEDING STRATEGIES OF CHILDREN 6-23 MONTHS IN MASINGA, MACHAKOS COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a ward of a degree in any other university or any other award.

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DEDICATION

This thesis is dedicated to my family members; my husband Muinde and my children, Cecilia, Abigael and John for their encouragement and unending love.

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ABBREVIATIONS AND ACRONYMNS

ASHA	Accredited Social Health Activists
ACF	Action Against Hunger
AMREF	Africa Medical Research Foundation
CHV	Community Health Volunteer
CHW	Community Health Workers
CHEW	Community Health Extension Workers
CF	Complementary Feeding
CHC	Community Health Committee
CU	Community Unit
EC	European Community
EICU	Earth Institute of Columbia University
FATVAH	Frequency, Amount, Texture, Variety, Adequacy, Active feeding, and Hygiene
FSAU	Food Security Analysis Unit
HRSA	Health Resources and Services Administration
IYCF	Infant and Young Child Feeding Practices
KDHS	Kenya Demographic and Health Survey
KAP	Knowledge Attitude and Practice
MIYCN	Maternal Infant and Young Child Nutrition
MOH	Ministry of Health
PSI	Population Services International
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Studies
SCHMT	Sub County Health Management Team

UNICEF	United Nations International Children's Emergency Fund
USA	United States of America
USAID	United States Agency for International Development
WHO	World health organization

OPERATIONAL DEFINITION OF TERMS

Community Health Volunteer (CHV) -A community member who has received basic training to support community activities, selected by the community and is responsible for passing nutrition and health information through nutrition counselling, cooking and feeding demonstrations, do home visits and refer the affected to the nearest health facility.

Community health Strategy - Is a program where community members improve their participation in health issues by uplifting their knowledge, skills and participation.

Community Health Extension Worker (CHEW) – A health officer recruited by the MOH who trains and supervises the CHVs.

Community halth Unit - An area consisting of 5000 people with 1000 households and has 50 CHVs.

Competency- Is the CHVs' knowledge, skills and practices on complementary feeding calculated based on overall knowledge score, skill's score and practices' frequency.

Knowledge - The capability of CHVs to explain complementary feeding in relation to WHO's criteria of Frequency, Amount, Texture, Variety, Adequacy and Hygiene (FATVAH).

Practices - The nutrition related activities or strategies carried out by the CHVs at household level such as counselling on complementary feeding, cooking demonstrations, home visits and referrals.

Skill- Is the ability acquired or developed through training or experience which enables one to perform a task.

ABSTRACT

Sub-optimal complementary feeding practices are a major cause of malnutrition among children aged 6-23 months in developing world. In Kenya, only 39% of children are fed according to the recommended optimal infant and young child nutrition practices with only 54% achieving adequate dietary diversity. Machakos County has a high prevalence of stunting (26.5%), wasting (6.5%) and underweight (8.1%) among children. Community Health Volunteers (CHVs) can help in reducing malnutrition and child mortality through advocacy of the recommended complementary feeding (CF) practices. However, CHVs' face myriad challenges including, low levels of education and inadequate training as their curriculum is limited on CF information. There is scarcity of information on the level of training and competence of CHVs in the area of CF. This study therefore aimed at assessing the competency (knowledge, skills and practices) of CHVs on CF in Masinga Sub-County of Machakos County. A cross-sectional analytical study design was adopted. A semi-structured questionnaire was administered to 168 CHVs randomly selected from 10 Community Units (CUs). An observation checklist was used to assess skills of CHVs. Four Focus Group Discussions (FGD) were used to gather qualitative information from CHVs on knowledge, practices and challenges faced. Key Informant Interviews (KII) were administered to nutritionists, nurses and public health officers and solicited information on knowledge and challenges faced by CHVs on CF. Data was analyzed using SPSS version 24 and a p value of <0.05 was used as the statistical significance. An overall knowledge score categorized as low (<40%), moderate (41-69%) and high (($\geq$70%) was used to establish CHVs' knowledge on CF. Majority (73.8%) of the CHVs, were female. The mean age of the CHVs was 46.64 ± 10.9 years. Majority (56.5%) had attained primary education as their highest level of education and farming was their main source of income. The findings further showed that 23.2%, 66.1%, and 10.7% of the participants had high, moderate and low CF knowledge score respectively. About 83.9% of the CHVs had fair counselling skills while the rest (16.1%) had unsatisfactory skills. Majority (83.5%) of the participants used nutrition counselling as their strategy to pass CF information to caregivers. Nearly half (43.5%) met the MOH requirements of visiting households at least once in a month. Overall, only 8.3% of the CHVs met the minimum expected competence threshold based on a combined knowledge, skills and practice score. Statistically significant associations were observed between the CHVs' CF nutrition knowledge level and their occupation (AOR = 1.63 C.I; 1.23-8.25), education level (AOR = 3.36 C.I; 1.07-10.59) and source of income (AOR = 3.50 CI; 0.91-13.40). Moreover, occupation (AOR = 3.50 CI; 0.27–16.05) and education level (AOR = 12.1 CI; 5.48–21.95) were also associated with the CHVs skills. The number of topics covered during nutrition counselling by the CHVs were also associated with the CHVs CF nutrition knowledge (AOR = 3.80 C.I; 1.24-11.63). The CHVs' skills were also associated with their practice of nutrition counseling (AOR = 45.43 C I; 20.47-89.54). MOH and other stakeholders should enhance training and capacity building of CHVs and the training curriculum should also be reviewed to strengthen the CF aspects.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Complementary feeding (CF) is the process beginning when breast milk is not enough to satisfy the nutritional requirements of infants, and hence other foods are needed, in addition to breast milk. (WHO/UNICEF, 2006; MOH, 2013). It is recommended that when introducing complementary foods, one should consider frequency, amount, texture, variety, adequacy, active feeding and hygiene (WHO, 2013). Poor CF leads to under nutrition which contributes to more than one third of children's mortality world wide (Bruno et al., 2013). In low and middle-income countries, malnutrition is high with 19.4% of children under-fives being underweight and 29.9% stunted (Zohra, 2013; Robert et al., 2008).

National statistics indicates stunting, underweight and wasting at 26%, 11% and 4% respectively. Stunting is highest among children 6-11 months old, a stage when complementary foods are started (KNBS/Macro, 2014). The sub-optimal CF practices also puts a country into a vicious cycle of losses in social capital related to disease and death which in turn reduces the country's productivity (MOH, 2013). Machakos County has a prevalence of 26.5% in stunting, 6.5% in wasting and 8.1% underweight (KNBS/Macro, 2014) and inappropriate CF contributes greatly to this high prevalence of under nutrition in children (Purvi et al., 2014).

Moreover, most of these children are fed on diet based on starchy foods and even when resources are available, caregivers lack knowledge on appropriate foods (Keding et al., 2015). Malnutrition is preventable through effective CF (Zohra, 2013).

In Kenya however, only 39% of all children 6-23 months eat as per recommended Infant Young Child Nutrition (IYCN) expectations (KNBS/Macro, 2009) and only 54% have adequate diversity of more than three food groups in their diet (MOH, 2013).

The use of community health strategy that supports and strengthens nutrition interventions and other care practices at tier one of the Kenyan health care system would greatly help in improving nutrition status and reduce child mortality in line with Kenya's Vision 2030 (MOH, 2007; Njiraini et al., 2020).

A community health volunteer (CHV) signifies a community member who has been trained to support community activities (WHO, 2013). Global shortage of medical workers increased the call for CHVs (Meere et al., 2009; Ariane, 2019). World Health Organization (WHO) adopted the issue of CHVs in 1978 after a conference attended by all WHO and United Nations International Children's Emergency Fund (UNICEF) member countries after a pronouncement of Alma-ata which promoted 'health for all' by 2002 (Henry, 2013). CHVs are usually selected based on their familiarity with their community issues and also on their motivation to serve their community (Prabhjot, 2015).

The CHV program in Kenya traces its origin to the early 1970s, when community-based health care projects emerged in different parts of the country. The National Health Sector Strategic Plan in Kenya formalized CHVs within their current structure (MOH, 2005; Njiriani et al., 2020). The launch of community strategy in 2006 also brought about the recognition of CHVs in Kenya which aimed at helping in delivery of the Kenya essential package of health proposed in the second National Health

Sector Strategic Plan 2005-2010 (MOH, 2005; Ariane, 2019). Kenya community strategy proposes that the country be divided into community health units each with a population of 5000 and having 50 Community Owned Resource Persons (CORPS) who are the CHVs where each one is responsible for 20 households supervised by two Community Health Extension Workers (CHEWs) (MOH, 2009).

Community health volunteers contributes to attainment of Sustainable Development Goals (SDGs) aimed at promoting good health for all ages (SDG 3) and equitable quality education (SDG 4) (Patrick, 2014; Dooleen, 2012). Studies of CHVs' programs in the United States indicate greatly positive impact on health outcomes, more so among low-income racial and ethnic minorities (Henry et al., 2014). Despite the efforts of the Kenyan government to strengthen the community strategy, its effectiveness is still facing several challenges. The training curriculum of the CHVs is limited on CF and the training frequencies also vary (Lungiswa et al., 2018; Prabhjot, 2015; MOH, 2013).

Despite motivation being a challenge, a study done in western Kenya showed that CHVs were highly motivated to pass nutrition knowledge to caregivers yet they received little or no training on CF (Kending et al., 2015). There is need to establish the competency of CHVs based on their knowledge, skills and practices in order to fill the existing gaps.

1.2 Statement of the problem and justification of the study

Malnutrition levels among young children in Machakos County are high with stunting, underweight and wasting at 26.5%, 8.1% and 6.5% respectively. Stunting and wasting are above the national level of 26% and 4% respectively (KNBS/Macro,

2014). Masinga Sub- County has unfavorable weather and is classified under the arid and semi-arid regions (MOH, Machakos, 2013) and is therefore vulnerable to food insecurity and malnutrition. Research findings on young child feeding have showed that sub-optimal feeding behaviour have negative effect on the growth, development and survival of infants and children, especially in developing countries (Makau, 2011). Undernourished Children have slow growth, high morbidity and mortality rates and can delay in motor and mental development (MOH, 2013). Moreover, diets low in iron are associated with poor performance in school which impacts negatively on the county's future generation and reduces the county's productivity (Robert et al., 2008; MOH, 2013).

Complementary feeding and breastfeeding for at least two years can help in improving the health status of children below five years (MOH, 2013; Medhavi et al., 2018). A study done in some parts of Machakos showed that knowledge on CF in terms of timeliness was low with majority of children being introduced to foods as early as two months and over 70% of children 6-23 months not consuming adequate nutrients (Korir et., 2014).

Community health volunteers may facilitate the improvement in health status and quality of life in rural communities especially the underserved populations (HRSA, 2011). Despite wide spread application of community strategy in Kenya since 2007, neither MOH nor its partners have assessed the effectiveness of the strategy in improving CF behaviour in children aged 6-23 months (Gilbert et al., 2012). Most of the studies done in Kenya's community have shown inadequate knowledge on CF to the caregivers and recommended empowerment of the community with CF

knowledge through use of CHVs (Korir et al., 2014). The training curricula for the CHVs, however, do not have adequate information on CF (MOH, 2007). Furthermore, there is scanty information on status of knowledge, skills and practices of CHVs on CF. Our study therefore, centred on assessing competency of CHVs in applying community strategy on CF in Masinga community hence contribute to achievement of SDG 3 which promotes good health for all ages.

1.3 Purpose of the study

The aim of this study was to establish competency levels of CHVs on use of CF strategies of children aged 6-23 months in Masinga Sub County, Machakos.

1.4 Objectives of the study were to;

1. Determine the socio-economic and demographic factors of CHVs in Masinga Sub-County.
2. Find out the training and knowledge of CHVs on CF of children 6-23 months of age in Masinga Sub County.
3. Assess the counselling skills of CHVs on CF to caregivers of children aged 6-23 months in Masinga Sub County.
4. Find out the practices of CHVs in educating caregivers on CF of children aged 6-23 months in Masinga Sub County.
5. Determine the relationships between knowledge, counselling skills and practices of CHVs in educating caregivers on CF of children aged 6-23 months.
6. Identify the challenges faced by CHVs when educating caregivers on CF.

1.5 Research hypotheses

$H0_1$: There is no significant relationship between socio-economic and demographic characteristics of CHVs and their knowledge on CF of children aged 6-23 months.

$H0_2$: There is no significant relationship between knowledge and practices of CHVs in educating caregivers on CF of children aged 6-23 months.

$H0_3$: There is no significant relationship between skills and practices of CHVs in educating caregivers on CF of children aged 6-23 months.

1.6 Significance of the study

The information generated from this study may be useful in developing policy guidelines on CF by different stakeholders such as the MOH both at national and county levels and other partners in health and nutrition. The information may be helpful in improving the community health strategy by enhancing nutrition specific components particularly advocating for CF and hence improved practices by caregivers.

1.7 Delimitations of the study

The research was only conducted among CHVs in Masinga Sub-County, Machakos County, thus its findings can only be used in that area and other areas that are similar.

1.8 Limitations of the study

Our study focused on strategies used by CHVs to pass CF information to caregivers and did not evaluate factors affecting the practices such as motivation. The actual CF practices of children aged 6-23 months were also not investigated.

1.9 Conceptual framework

Our study adapted conceptual framework by Margaret (2014) (Figure 1.1)**.** The socio-economic and demographic characteristics may affect the knowledge, counselling skills of CHVs on CF as well as their practices in taking the roles in advocating for CF in the society. More educated CHVs are likely to be knowledgeable on CF and consequently more likely to pass it well to caregivers compared to the less educated CHVs. Socio-economic and demographic characteristics may also have an influence on the challenges these CHVs face during their work. Low or no income may limit CHV's ability to conduct household visits as they are likely to commit their time into income generating activities. The training of the CHVs may have an influence on their knowledge on CF and may have an effect on their skills and practices.

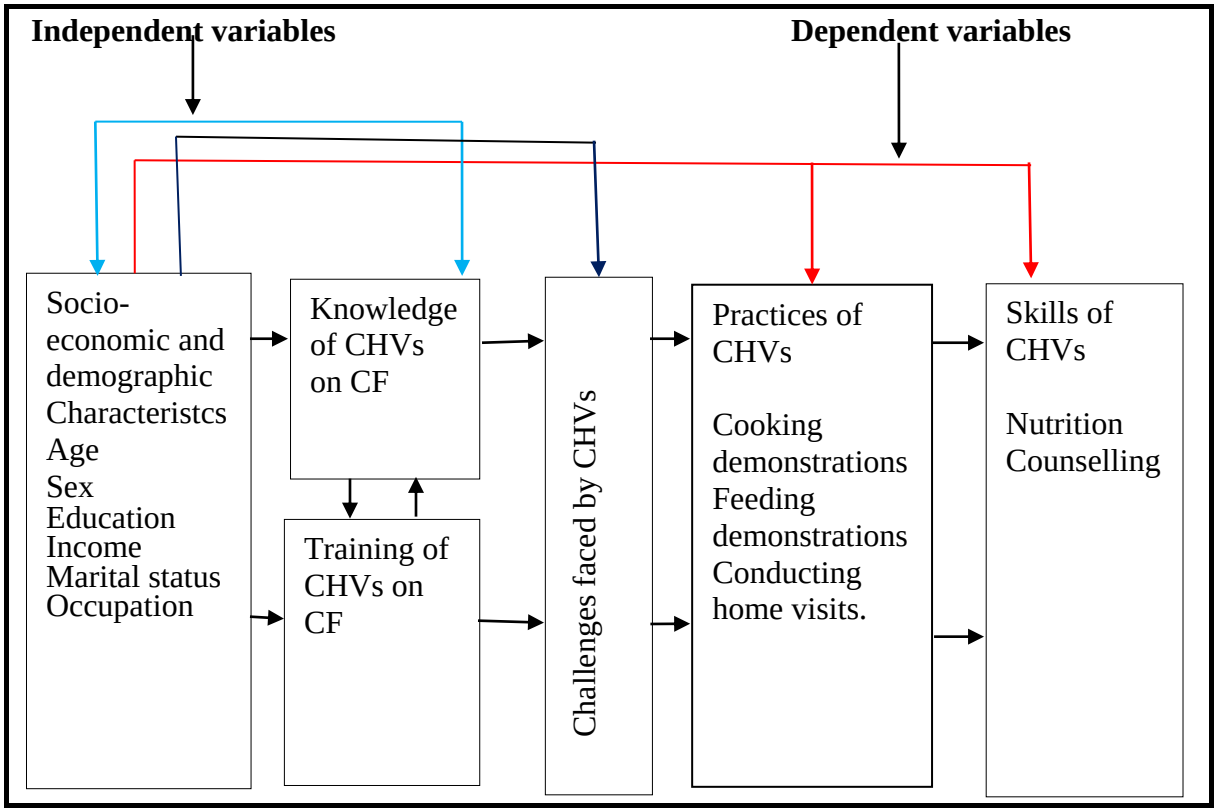


Figure 1.1 Conceptual framework on socio-economic and demographic characteristics, competence and challenges of CHVs educating caregivers on CF. *(*Adapted and modified from Margaret, 2014)

CHAPTER TWO: LITERATURE REVIEW

2.1 The concept of complementary feeding

Complementary feeds are added to child's diet when breast milk is not adequate to satisfy nutritional requirements of the child (WHO, 2006; Medhavi et al., 2018). Complementary feeding interventions target the age of 6–23 months which is the period of high incidence of malnutrition, micro-nutrient deficiencies and diseases. Complementary foods should achieve frequency, amount, texture, variety, adequacy, active feeding and hygiene (FATVAH) (MOH, 2013). Table1.1 shows the recommended texture, frequency and amounts of food to offer to children aged 6-23 months.

Table 1.1: Recommended texture, frequency and amounts of food for children aged 6-23months

Age	**Texture**	**Frequency**	**Amounts of food per meal**
6-8 months	Begin with thick porridge, mashed foods. Give mashed family diet.	2-3 times in a day and frequent breastfeeds . 1-2 snacks can be given..	feed 2-3 tablespoonful every feed and increase slowly to ½ a 250 ml cup.
9-11 months	Give chopped or mashed foods plus foods the baby can take up with fingers.	3-4 meals and breastfeeding . Give 1-2 snacks.	½ of a 250 ml cup.
12-23 months	Modified family foods.	3-4 meals plus breastfeed., 1-2 snacks.	¾ to one 250 ml cup.

Source; WHO/UNICEF (2006), Infant and Young Child Feeding Counselling Guide

In case the baby is not breastfeeding, 1-2 cups of milk should be given per day in addition to the feeding (WHO/UNICEF, 2006; MOH, 2013)

2.2 Socio- economic and demographic characteristics of CHVs

Understanding how socio-economic and demographic factors influence CHVs' performance is of great importance mainly because of adoption of result-based community health services. However, there are contradictions on whether socio-economic and demographic characteristics determine CHVs success (Lehmann & Sanders, 2007). Both gender is recruited as CHVs with women dominating largely. Research done by a European commission in Machakos, Turkana North and Kibera contradicts this by stating that men are equally recruited as CHVs. In Kenya, the consideration for education is just minimal literacy (MOH, 2007; Ndende et al., 2012). Studies done in Brazil, Bangladesh and Busia in Kenya, showed that, the more educated the CHV were, the higher the performance (Syed et al., 2009; Francisca et al., 2016). Margaret (2014) and Syed et al. (2009) reported that studies in Kenya and Bangladesh respectively indicated that majority of CHVs are between the ages of 34-45 years since the younger ones sought better jobs elsewhere. They also reported that older CHVs were more respected.

Majority of the CHVs are married women but they face a challenge of childcare (Margaret, 2014). A study done in Nyanza, region, Kenya on CHV's performance, showed that most of their households (60%) had 6 or more members and their household wealth index was 23.4% which was categorized as poor (Yoshito et al., 2015). Although it is widely documented that socio-economic and demographic

characteristics are important considerations for CHVs' recruitment, there is scarcity of information on the link between CHVs' socio-economic and demographic factors and CF.

2.3 Training, knowledge and counselling skills of CHVs on complementary feeding

The Kenyan Community Strategy is a program where community members improve their participation in health-related activities by boosting their knowledge, skills and engagement (MOH, 2007; Njiraini, 2020). Upon selection, Kenyan CHVs received, a 10-day training on general health issues. In terms of supplementary training, NGO partners partially or selectively followed the MOH guideline depending on their area of interest. However, the training content was inadequate on CF. (Aseyo et al., 2018).

Studies done in India on the Anganwadi and the Accredited Social Health Activists (ASHA) workers showed that, knowledge level on breastfeeding was high but that on CF required further improvement (Purvi, 2011; Vertika et al. 2014). Another study by Kumudha (2010) on the frontline workers, reported that only 11-25% were aware of the recommended frequency of feeds but their knowledge on the quantity was low. In another study done in South Africa on caregivers showed that the knowledge of CHVs was low despite 62% of the caregivers reporting that CHVs are their main source of information (Mieke, 2007). In another study in Western Kenya, information on food variety among caregivers was moderate although the idea of combining cereals and legumes in porridge remained a challenge (Keding et al., 2015). The literature reviewed shows that the training, knowledge and skills of CHVs are sub-

optimal and majority of the CHVs cannot explain CF satisfactorily in terms of FATVAH as recommended by WHO and MOH (MOH 2013).

Gallagher et al. (2015) defined competency as the capability to do certain work appropriately which can be influenced by a mixture of skills, experience and knowledge. The competency of Kenyan CHVs needs improvement in CF (Schneider et al., 2017).

2.4 Practices of community health volunteers on CF

In addition to conducting household visits, Kenyan CHVs are tasked with conducting community dialogue days and community action days where they involve community members in solving their own problems (Aseyo et al., 2018; Njiraini et al., 2020). According to Mertin et al., (2015) and MOH, (2007), CHVs visit households either weekly or monthly and make observations on CF practices by caregivers and counsel them on recommended practice. In Zimbabwe, CHVs encouraged mothers to adopt good IYCF practices (Ebbie et al., 2012; Carlos, 2012). A counselling guide consisting of feeding problems and solutions was provided to CHVs in India while in Mali, story books illustrating benefits of good CF practices were used (USAID, 2011). A study done by Action against Hunger (ACF-USA) (2007) in Tajikistan indicated that CHVs pinned written papers in their houses where women learned CF messages (WHO, 2006).

The Earth Institute of Columbia University (EICU) documented that CHVs also facilitate outreach services (EICU, 2013). Keding and Waswa (2015) have reported that CHVs passed nutrition knowledge to the caregivers through demonstrations on preparation of CF. Cooking and feeding demonstrations have also been supported by a literature review done by USAID (2011) where CHVs in India, Bangladesh and

Vietnam used them. The practices of CHVs on CF in Kenya, however, have not been well established.

2.5 Challenges faced by CHVs in passing complementary feeding messages

Several challenges affect CHVs while offering community services. Lack of appropriate counseling aids, incentives and retention are some of the challenges faced by the CHVs (Kumudha et al., 2010; Meghan et al., 2014; Prabhjot, 2015). Aseyo et al. (2018) in a study on use of CHVs as behavior change agents, reported that lack of financial and non-financial incentives affected their behaviour, motivation and attitude and as a result, the CHVs prioritize work given by other organizations that pay some stipend other than that of MOH. Frequent transfer of CHEWs is a bottle neck to CHVs' activities as it results to weak supervision (MOH, 2006; Njiraini et al.,2020). Lack of skills-based as well as refresher training was regularly reported as a impendment to CHVs' achievement and sustenance (Kithuka, 2016; USAID, 2020). Furthermore, some CHVs were not trained on how to keep information as well as how to pass it to caregivers as reported by Rochils et al. (2016), in his study on involvement of CHVs in health education con ditions.

Community health volunteers' programs serve rural communities where transport is a challenge and cultural barriers which prevent young children from consuming some foods such as meat also occur (HRSA, 2010). Socio-economic issues of the society are also a predicament to CHVs' work especially to the poor community members who are financially constrained and cannot implement some recommendations given by the CHVs (Aseyo et al., 2018). New programs have over-burdened CHVs with competing priorities and the village health committees are not active (Andy et al., 2007).

Monitoring and evaluation on nutrition and other health related indicators is also not clear to CHVs (Meghan et al., 2014). Community health volunteers, being informal and unsalaried can jeopardize their ability to provide health services since morale and motivation is a challenge (MOH, 2006; Njiraini et al.,2020); their relationship with other professional health workers is also poor due to unclear roles (USAID, 2012). Lack of well-equipped health facilities makes CHVs reluctant to refer clients (Heunis et al., 2011). Corruption, political and socio-economic issues in some countries coupled with irregular donor support have also affected CHVs' programs (Kithuka, 2016). Lack of sufficient uniform or badges that could help identify CHVs to the community, affected their reception and acceptance by the community (Aseyo et al., 2018). From the literature reviewed, it is not clear whether the challenges faced by CHVs are related to their competency in implementing CF to caregivers of children aged 6-23 months.

2.6 Summary of literature review

Knowledge on CF among the CHVs is sub optimal despite being referred to as community resource persons. This may be attributed to poor capacity building among CHVs. Poor knowledge on CF is likely to affect their counselling skills, practices and overall performance. Furthermore, there is scanty of information on specific challenges faced by CHVs in Machakos County. Although these CHVs face several challenges, there is scanty information explaining these challenges in relation to CF practices. There is also meagre information indicating how the socio-economic and demographic characteristics and knowledge affect their skills and practices. Furthermore, their knowledge and practices have not been well established in many

countries including Kenya. Through this study, competency of CHVs in terms of knowledge, skills and practices was assessed.

CHAPTER THREE: METHODOLOGY

3.1 Research design

The research used cross sectional analytical design which was suitable in showing relationships among the knowledge, skills and practices of CHVs in CF. It was also suitable because population studied was a screen shot of the whole population. Data collection, analysis and presentation were done using both qualitative and quantitative approaches.

3.2 Study variables

3.2.1 Dependent variables

These included counselling skills of CHVs to caregivers on CF, practices such as feeding and cooking demonstrations as well as conducting routine household visits. The practices of the CHVs were assessed by comparing them with the MOH recommendations for CHVs' activities which requires them to conduct household visits and do counselling on health issues on monthly basis in every household within their area of coverage.

3.2.2 Independent variables

These include CHVs' socio-economic and demographic characteristics, knowledge and training. A knowledge score was obtained based on distinct CF topics.

3.3 Study area

The research was conducted in Masinga Sub- County. It has 139,048 projected population from 2009 census with doctor population ratio of zero [0] and nurse ratio of 1:1926. It has a population density of 96 persons per sq. km and has been split into

two administrative divisions that is, Masinga and Ndithini. The Sub-County has 8 health centers, 23 dispensaries and 10 community units. In addition, the Sub-County has 5 wards and 500 CHVs though only 410 are active (DHIS, 2016). Majority of the community members are farmers who engage in both crop farming and cattle rearing. These activities do not thrive well as the area is classified under arid and semi-arid regions of Machakos County and therefore receives little rain (MOH, Machakos, 2013). There is also limited data reporting on CHVs in Masinga Sub County despite them being used widely in health matters.

3.4 Target population

The study targeted CHVs in Masinga Sub County. There are 410 CHVs who have been selected based on their willingness to serve their community and not necessarily on their education level Table 3.1)

Table 3.1: CHVs selection Criteria and their roles

CHVs selection Criteria	CHVs roles
1. Must be permanent resident of the area and able to read and write. 2. Should be concerned about the welfare of the community and willing to volunteer. 3. Respected by the villagers as good example of healthy behaviour. 4. Should be approved by the community leaders.	1. Promoting good health practices. 2. Mobilizing the community for health action. 3. Referring cases to facilities. 4. Holding community dialogue days. 5. Carrying out home visits. 6. Keeping heath records.

3.4.1 Inclusion criteria

The active CHVs who worked in Masinga beyond six months by the time of study as well as trained using the MOH community health strategy guidelines.

3.4.2 Exclusion criteria

Those not willing to be involved in the study.

3.5 Sample size determination

Using Cochran formula (Mugenda and Mugenda, 2003) to determine the study population with 95% confidence interval and a sampling error of 5%.

$n= (Z^2pq)/d^2)$ Where:

n= is the desired sample size.

Z is the corresponding value from the normal distribution for the desired confidence (in this case 95%) = 1.96

p= percentage of CHVs (80%) are competent in delivery of maternal and child health information through household visits (USAID, 2020).

q= the percentage of target population not having the desired characteristics which is 20

% (1-p)

d= measured level of precision (degree of accuracy desired) at (0.05)

Thus,

$n= (1.96^2 x0.80x0.20)/0.05^2)$

n= 245

Since N is the estimated total population below10,000, the sample size was modified by the formula,

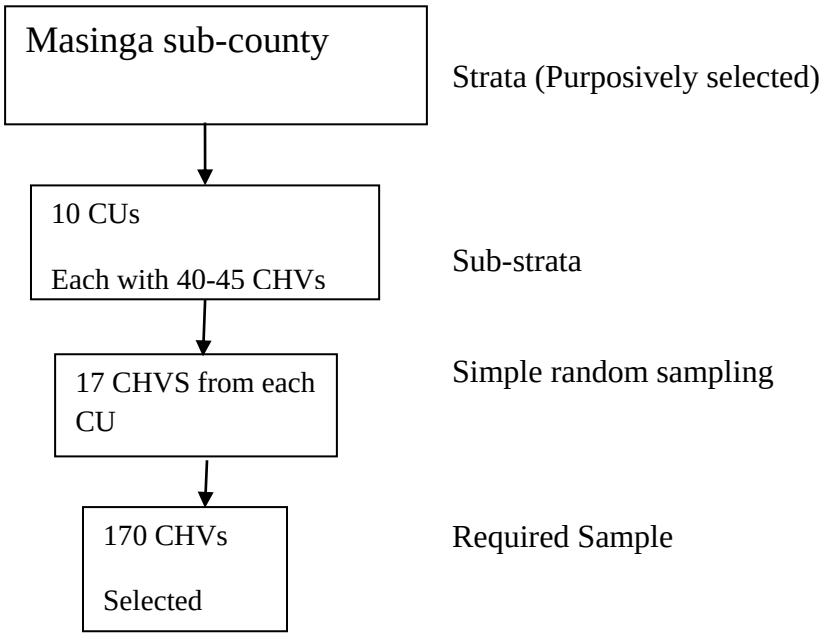
nf= n/(1+n)/N) where nf is the preferred sample size.

nf= 245/ (1+245/410) =154

10% adjustment was further made to cater for non-response thus, sample size was 170.

3.6 Sampling technique

Stratified random sampling was applied to choose the desired sample size. Since Masinga Sub County has 410 CHVs in ten CUs, which in this case was the subgroups, a list of all CHVs in all these sub-groups was made. Using random sampling, 17 CHVs were selected from each sub group.forming a total of 170 The study however, reported data of 168 participants.



Total anticipated sample size was 170 CHV but due to non-response, the study reported on 168 participants.

3.6.1 Response rate

One hundred and sixty-eight (168) CHVs were interviewed in Masinga Sub County, Machakos County. The study had 98.8% response rate of the expected sample size.

3.7 Research Instruments

3.7.1 Questionnaire on socio-economic and demographic characteristics, assessment of training, knowledge and practices

A questionnaire was applied to gather information on socio-economic and demographic information of CHVs as well as their knowledge, skills, training and practices on CF of children aged 6-23 months (Appendix B). A validated questionnaire on MIYCN was modified to fit this study (Najihah et., 2019).

3.7.2 Focus Group Discussion (FGD) Guide

FGD guide (Appendix D) was applied to gather details from CHVs during FGDs. The guide elicited information on the knowledge, skills and practices as well as the challenges faced by CHVs as pertains to CF.

3.7.3 Key Informant Interview (KII) guide

A KII guide (Appendix E) was put into use to obtain facts from MOH staff. The guide gathered details about knowledge, practices and challenges faced by CHVs in relation to CF.

3.7.4 Observation checklist

An observation checklist (Appendix C) was applied by research assistants to score CHVs based on their counselling skill while passing CF information to caregivers.

3.8 Pre-testing

Pre-testing was conducted to CHVs (10%) in Kaluluini CU in Yatta Sub-County. This provided the data collectors the chance to experience and to pick up specific problems that might arise in the field. Corrections were done accordingly based on outcome of the exercise.

3.9 Validity and reliability of research instruments

3.9.1 Validity

A validated (MIYCN) questionnaire was applied (Najihah et., 2019). The questionnaire was gauged by the researcher's supervisors to make sure that it was as per the objectives of the research.

3.9.2 Reliability

Test-retest reliability of the research instruments was obtained during pretesting. Two pretest sessions were done to ten CHVs from Kaluluini CU in Yatta Sub-County. Test-retest reliability was obtained by examining the consistency of answers using cronbach's formula and a correlation coefficient of 0.84 was obtained (Ajay, 2017).

3.10 Recruiting and training of research assistants

Two female Research Assistants with a minimum of Kenya Certificate of Secondary Education and at least a certificate in nutrition were recruited. They were required to speak Kiswahili and Kamba fluently. Involvement in previous surveys was an added advantage. The areas covered during the training included: study objectives, interview procedures, recording of the responses and research ethics. The training was done for four hours through facilitation, discussions and practical methods.

3.11 Data collection procedures

The researcher sought assistance from community health extension workers (CHEWs) in charge of community units (CU) from which CHVs were sampled from. The health facility in charge of the CU's link facility was also requested for assistance. This was done prior to the date of the interview.

3.11.1. Face to face interview with CHVs

Face to face interview was conducted to the CHVs at a private room at the link health facility within the CHV's working area. Both researcher and research assistants interviewed the CHVs and noted down all the answers appropriately. This was repeated until all the sampled CHVs were interviewed.

3.11.2. Observation checklist for the CHVs

After face-to-face interview, every CHV was assessed while counselling caregivers with children aged 6-23 months on CF. An observation checklist was then used to score the CHVs on their counselling skills as well as on delivery of CF key messages.

3.11. 3. Focus group discussion

Four focus group discussions (FGD) were held with CHVs. Each discussion took about 30-60 minutes and comprised of 8-12 CHVs. The moderator controlled the discussion to ensure active participation and the research assistants noted down the answers. The discussion was also audio- tape recorded upon informed consent from the respondents.

3.11. 4. Key informant interview

Four key informant interviews (KII) were conducted to one nutritionist, one nurse, from Masinga health facility and to a public health officer from Kivaa Health centre and to another nurse from Katulye Dispensary. The KII elicited information on the CHVs' training as well as the challenges they face as they pass CF messages to caregivers. All the information was noted down and recorded as well.

3.12 Data analysis

Data was cleaned, coded and entered in SSPS version 24 for analysis. Descriptive statistics such as frequency, percentages, means and standard deviation were applied to explain the CHVs' socio-economic and demographic characteristics, knowledge and skills. Inferential statistics (chi-square, t-test, ANOVA, correlation and logistic regression) were used to establish relationships and associations among the dependent variables (practices and skills) and the independent variables (knowledge and socio-economic and demographic characteristics). Overall knowledge score was determined using the total correct response. Every correct knowledge response was given a score of 1. All correct responses were then converted into percentages which were then categorized as low (<40%), moderate (41-69%) and high ((≥70%) (Kigaru et al., 2016; Mohamed, 2019). Similarly, counselling skills score was obtained by scoring the CHVs on a 3-scale such that 0-poor, 1-fair and 2-good. Percentages were then obtained from the scores. (Asmana et al., 2017)

The training adequacy of the CHVs was analyzed based on content and duration of the training. Complementary feeding practices of CHVs were assessed based on the recommended practices in community strategy (MOH, 2006; MOH, 2013). A p value of <0.05 was used as the statistical significance. Qualitative data was used to complement the quantitative data.

3.13 Logistical and ethical considerations

Authority to carry out research was obtained from Kenyatta University Graduate School (Appendix J). Ethical clearance was gotten from Kenyatta University Ethics Review Committee (KUERC) (Appendix K). Research permit was received from the National Commission of Science and Technology Innovation (NACOSTI) (Appendix

H). In addition, authority was obtained from Machakos County Health Management Team (CHMT) (Appendix I) as well as the Masinga Sub County Health Management Team (SCHMT). An informed consent was requested from respondents before interviewing them which was by signature or thumb print (Appendix A). Strict confidence was assured to the respondents by the researcher.

CHAPTER FOUR: RESULTS

4.1 Introduction

The purpose of the study was to find out the competency of CHVs in CF strategies of children 6-23 months. This chapter gives the results of the study as per its objectives.

4.2 Socio-economic and demographic characteristics of CHVs

Nearly three quarters (73.8%) of the CHVs were female compared to their male counterparts. Their mean age was reported as 46.64±10.9 years with the majority (36.9%) being in the age category 41-50 years and the (21-30 years) the oldest (> 60 years) age categories forming the minority at 6.5% and 11.9% respectively (Table 4.1). With regards to marital status, 79% were married, 2.4% were single and 14.3% were widowed. Nearly half (47.6%) of the respondents were farmers and only 8.3% had some form of employment. Their education levels varied with majority (56.5%) having received primary education and only 1.8% without any formal education. Three quarters (75.6%) of the CHVs relied on less than KShs. 10,000 per month (Table 4.1).

Table 4.1 Socio-economic and demographic characteristics of the CHVs

N=168 Variable	n	%
Sex		
Male	44	26.2
Female	124	73.8
Age (years)		
21-30	11	6.5
31-40	35	20.8
41-50	62	36.9
51-60	40	23.8
> 60	20	11.9
Marital status		
Single	4	2.4
Married	133	79.2
Separated	7	4.2
Widowed	24	14.3
Education level		
No formal education	3	1.8
Primary	95	56.5
Secondary	56	33.3
Tertiary	14	8.3
Occupation		
Employed/salaried	14	8.3
Merchant/trader	15	8.9
Small scale trading	40	23.8
Farming	80	47.6
Unemployed	16	9.5
Casual labourer	3	1.8
Monthly income		
Ksh ≤ 10,000	127	75.6
10001-20000	27	16.1
20001-30000	14	8.3

4.3 Training and knowledge of CHVs on CF of Children aged 6-23 Months

4.3.1 Training of CHVs on complementary feeding

Nearly all (87.5%) CHVs were trained CF. Majority of the CHVs had been trained by NGOs (72.6%). Majority reported to have been trained for few hours (less than a day) (63.1%) while a few (24.4%) been trained for few days (1-3 days) (Table 4.2).

T*able 4.2 Training of CHVs on complementary feeding*

		N=168 n	%
Trained on CF	Yes	147	87.5
	No	21	12.5
Trainer	MOH	46	27.4
	NGO	122	72.6
Duration of training	Less than a day	106	63.1
	Days (1-3days)	41	24.4
	Not trained	21	12.5

Several NGOs were involved in the training; Africa Medical Research Foundation (AMREF) (24.4%), and 'CAN DO' (22.6%). Plan-Kenya and Population, Services International (PSI) however trained slightly lower numbers at 14.3% and 11.3% respectively. In addition, 83% had been trained by both MOH and NGOs. (Figure 4.1)

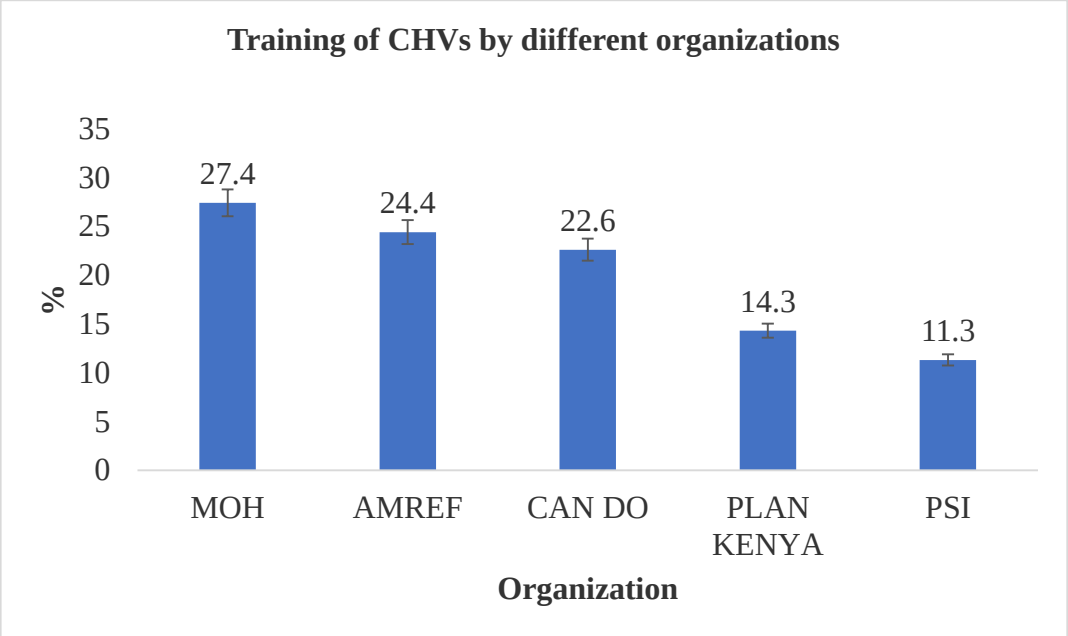


Figure 4.1 Organizations involved in the Training of the CHVs

4.3.2 Training of CHVs on different topics

The CHVs reported to have received training on different topics in CF. Slightly more than a quarter (26.9%) reported to have been trained on types of food with nearly a quarter (21.5%) trained on food variety and food hygiene (20.2%). Those trained on food texture were 11.4%. Training on food frequency, amount, adequacy, responsive feeding and age of initiation of CF were reported at very low levels (<10%) with those trained on responsive feeding being the least (0.5%) (Table 4.3). Overall, the coverage of the training received on CF was inadequate..

Table 4.3: Topics trained to CHVs on complementary feeding

		Responses		
		n	%	% of Cases
Topic trained*	Types of food	109	26.9	75.2
	Frequency of CF	39	9.6	26.9
	Amount of food	25	6.2	17.2
	Texture of food	46	11.4	31.7
	Variety of food	87	21.5	60.0
	Adequacy of food	7	1.7	4.8
	Hygiene in food preparation	82	20.2	56.6
	Responsive feeding	2	0.5	1.4
	Time of initiationof CF	8	2.0	5.5
Total		405	100	279.3

*****Multiple responses

From the focus group discussion with the CHVs, it was reported that CF training was done in addition to other health issues such as hygiene, antenatal care and immunization where the trainer would take a few hours to talk about child feeding generally.

''They trained us on many things such as management of diarrhoea, ensuring every home has a toilet, immunization and so on. They mentioned about feeding of children one day for a few hours'' FGD participant, Masinga, 2019.

4.3.3 Knowledge of CHVs on complementary feeding

Knowledge of CHVs was assessed using sixteen different questions on recommended CF practices (WHO, 2010; MOH, 2013) and overall knowledge score calculated and expressed as a percentage. The mean knowledge score was 55.77 ± 15.07 SD. Almost all the CHVs (94%) were knowledgeable on age of initiation of CF. More than three quarters (82.1%) of the CHVs gave correct response that early initiation of CF causes illnesses to infants. However, only 48.2% were aware that late introduction can lead to poor health status of the infants. Slightly more than half (50.6%) of the CHVs were knowledgeable on consistency of complementary foods. Food variety and feeding during illness stood at 66.7% and 64.9% respectively. However, only a few gave correct responses on amount of food to give at six months (25.6%) and frequency of feeding at 7-8 months (23.8%) (Table 4.4).

Table 4.4: Knowledge of CHVs on complementary feeding

	N=168	
Knowledge aspect	n	%
1. Time of initiation of CF	158	94
2. Early initiation poses health risks	138	82.1
3. Late initiation leads to poor health	81	48.2
4. CF refers to solid/semi solid food and not liquid food	85	50.6
5. From 6 months, children eat 2-3 meals in a day plus snacks.	81	48.2
6. Feeding on variety of foods	112	66.7
7. Continued breast feeding for two or more years	120	71.4
8. Encouraging child to feed	109	64.9
9. Feeding more during illness	109	64.9
10. Food enrichment	118	70.2
11. Frequency of feeding at 6 months	83	49.4
12. Amount of food at 6 months	43	25.6
13. Amount of food at 7-8 months	42	25.0
14. Frequency of feeding at 7-8months	40	23.8
15. Frequency of feeding at 9-11 months	52	31
16. Amount of food at 12 months	95	56.5
17. Frequency of feeding at 12 months	94	56

n = respondents who gave correct responses

The knowledge score was calculated and further grouped into three classes which were <40% as low, 41-69% as moderate and ≥70% as high (Kigaru et al., 2016; Mohamed, 2019). Majority of CHVs had moderate (66.1%) knowledge on CF of children aged 6-23 months. Those categorized as having high knowledge were 23.2% and those with low knowledge were 10.7% (Figure 4.2).

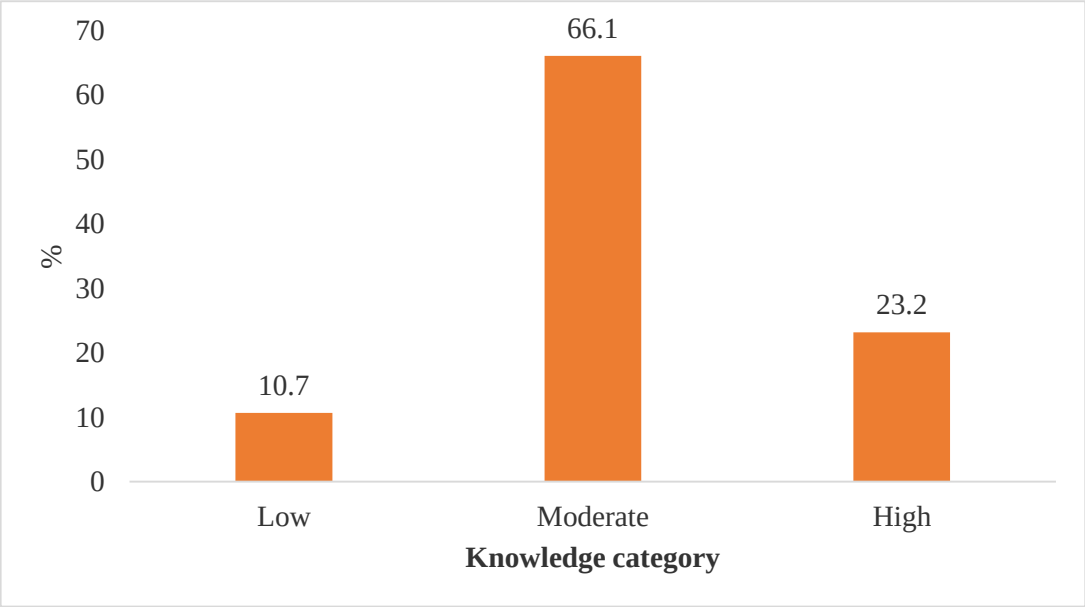


Figure 4.2: Knowledge levels of CHVs on complementary feeding

4.4. Counselling skills of CHVs on complementary feeding

Counselling skills of the CHVs on CF was assessed by use of observation checklist. Observation checked the general counselling skills as well as the use of the skills to deliver CF key messages based on the age of the child. The study assessed the CHVs during a counselling session with a caregiver and scored the CHV as either 0 (poor), 1(fair) or 2 (good) based on their demonstrated skills (Asmana et al., 2017).

Only 35.7% were good at creating rapport with the caregivers and requesting for permission to talk to the caregiver with majority being fair (45.2%). Less than half of the CHVs were good (36.3%) at paying attention to the caregivers but only 18.5% of

them probed and encouraged the caregivers well to talk. As regards to the use of positive non-verbal communication, more than half were poor and only 4.2% were good at this skill. (Table 4.5).

Table 4.5: Skills of CHVs in counselling caregivers on complementary feeding

	N=168		
Counselling skill	Poor	Fair	Good
	n **(%)**	**n (%)**	**n (%)**
1. Introduction & request for permission	32 (19)	76 (45.2)	60 (35.7)
2. Passes friendly remarks (affirmation)	50 (29.3)	92 (54.8)	26 (15.5)
3. Pays attention to caregiver	27 (16.1)	80 (47.6)	61 (36.3)
4. Encourages caregiver to talk (probes)	58 (34.5)	79 (47)	31 (18.5)
5. Positive non-verbal communication	115 (68.5)	46 (27.4)	7 (4.2)
Delivery of key messages			
6. Start of CF	61 (36.3)	79 (47)	28 (16.7)
7. Amount of food to give	97 (57.7)	51 (30.4)	20 (11.9)
8. Frequency of feeding a breastfeeding child	97 (57.7)	49 (29.2)	22 (13.1)
9. Local food that constitutes 7 food groups	32 (19)	89 (53)	47 (28)
10. Food thickness		55 (32.7)	9 (5.4)
11. Food enrichment	104 (61.9)	42 (25)	35 (20.8)
12. Hygiene and food safety during feeding	91 (54.2) 43 (25.6)	47 (28)	78 (46.4)
13. Responsive feeding		14 (8.3)	4 (2.4)
14. Recommended changes in appropriate feeding	150 (89.3) 84 (50)	72 (42.9)	12 (7.1)
15. Explains reason for change	127 (75.6)	36 (21.4)	5 (3.0)
16. Summary of key issues	115 (68.5)	50 (29.8)	3 (1.8)
Skills score	27 (16.1)	141 (83.9)	0 (0)

In delivery of key messages to the caregivers, majority (57.7%) of the CHVs were poor at explaining to caregivers the amount of food to be given to a child at a particular age as well as the frequency of feeding. Local foods that constitute the seven food groups were explained fairly well by 53% of the CHVs. Food thickness and responsive feeding were also among the poorly explained aspects by the CHVs scoring 61.9% and 89.3% respectively (Table 4.5).

The counselling skills' mean score of the CHVs was 0.84 ± 0.37 SD. The score was further categorized into poor (0), fair (1) and good (2). The CHVs performance ranged between the poor and fair category with majority (83.9%) having fair counselling skills.

4.5 Practices of CHVs in educating caregivers on complementary feeding

4.5.1 Frequency of household visits

The frequency at which the CHVs conducted household visits varied. Those who met the MOH requirement of doing household visits at least once in a household in a month were 43.5%, with 22% reporting more frequent visits.

4.5.2 Strategies used to pass CF messages

As pertains to strategies (methods) that were used to pass CF messages to caregivers, the majority (83.5%) of the CHVs reported to use nutrition counselling (Table 4.6).

Table 4.6: Strategies used in passing CF information to caregivers

		Responses		
		n	%	Percent of Cases
Methods used to pass CF messages *	Nutrition counseling	162	83.5	96.4
	Demonstrations	26	13.4	15.5
	General health talk	6	3.1	3.6
Total		194	100.0	115.5

*Multiple response (Use of two or more methods)

Although 83.5% of CHVs reported to use nutrition counselling to pass CF messages to caregivers, only 41.7% conduct them at least once in a month as expected by the MOH. Majority (46.4%) did the counselling less frequently and 3.6% didn't counsel the caregivers at all (Figure 4.3).

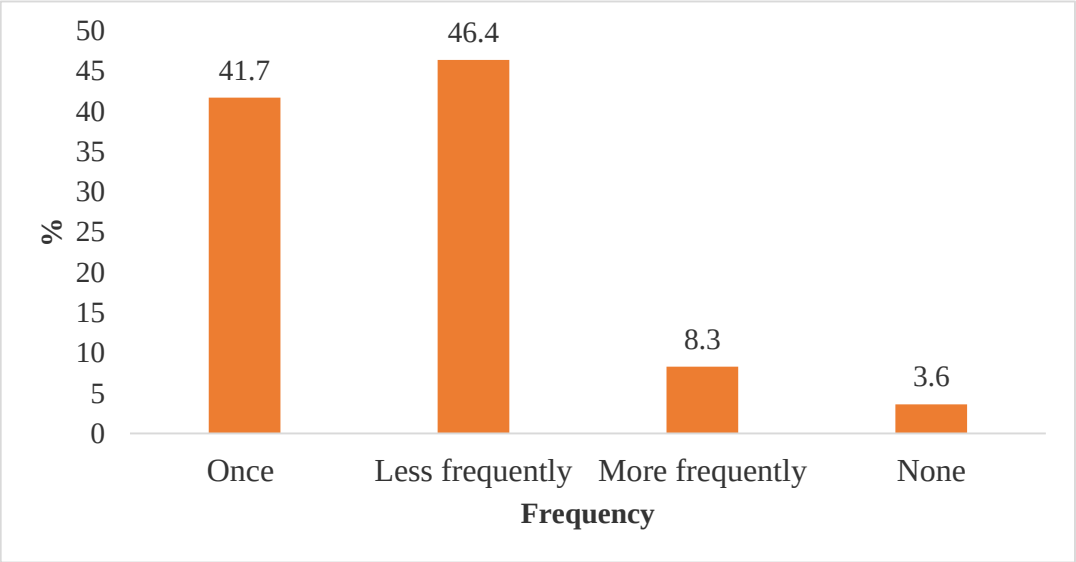


Figure 4.3: Nutrition counseling frequency by CHVs in the households.

The CHVs were interviewed on the coverage of CF during the counselling sessions with caregivers of children 6-23 months. The reported coverage was mainly on food variety (80.2%) and food hygiene (67.9%). Responsive feeding (3.7%) and food preparation 2.5% were rarely covered during the counselling sessions (Table 4.7).

Table 4.7: Topics covered by CHVS during nutrition counselling sessions

	N=168	
Topic discussed*	n	%
Age of initiation of CF	25	15.4
Amount of food to give	48	29.6
Frequency of feeding	32	19.8
Texture of food	33	20.4
Food variety	130	80.2
Food hygiene	110	67.9
Responsive feeding	6	3.7
Food preparation	4	2.5

*Multiple response (Discussing two or more topics in a session)

Among the strategies used by the CHVs to pass CF messages to caregivers, cooking demonstrations and role plays were least done compared to nutrition counselling.

Only 24.4% of the CHVs used cooking and feeding demonstration at least once in a month with 76% not using them at all. Although some CHVs reported to have used role plays as a method of passing CF messages to caregivers, only 3% used them once in a month while the rest and the majority were not using them (Figure 4.4).

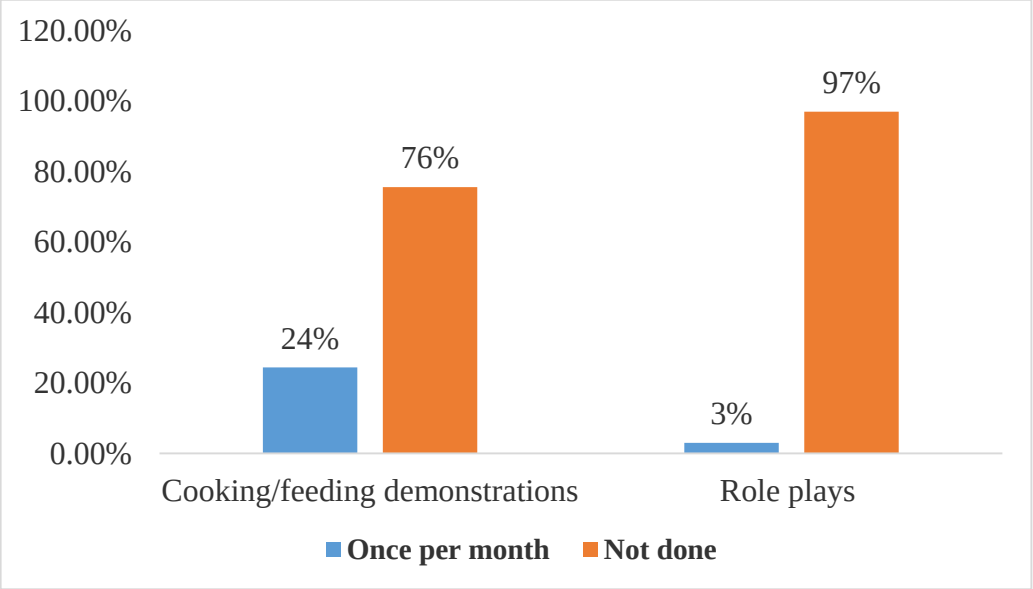


Figure 4.4 Frequency of demonstrations and role plays by the CHVs

4.5.3 Follow-up and availability of job aids among the CHVs

More than three quarters (89.3%) of the CHVs followed up the caregivers who they counselled on CF to know their progress. On the other hand, only 26.2% had job aids on CF (Maternal and Child Health Counselling Cards) for use during nutrition counselling (Table 4.8).

Table 4.8: Caregivers follow-up and use of Job aids on complementary feeding

Variable		N=168 n	%
Follow-up	Yes	150	89.3
	No	18	10.7
Availability of job aid	Yes	44	26.2
	No	124	73.8

4.5.4 Competence of the CHVs based on their knowledge, skills and practice combined

The competence of CHVs was calculated based on their overall knowledge score, skills score as well as their practices. Those who met the minimum expected threshold for knowledge (moderate level and above), skills (fair and good) and practice (nutrition counselling/demonstrations, frequency of counselling/demonstration and the number of topics covered) was established by the study (USAID, 2021). The study found that only 8.3% of the participants met the minimum expected threshold of the three indicators (competency) (Table 4.9).

Table 4.9: Competency levels of CHVs based on knowledge, skills and practices

Variable	Mean score	N=168 Categories		
		Low	Moderate	High
		n (%)	n (%)	n (%)
Knowledge	55.77±15.07SD	18 (10.7)	111 (66.1)	39 (23.2)
Skills	0.84 ± 0.37 SD	27 (16.1)	141 (83.9)	0
Practices		Yes n (%)		
Home visits		73(43.5%)		
Nutrition counselling		162(83.4%)		
Demonstrations		26(13.3%)		
		Competent n (%)	Not competent n (%)	
Overall competence		14 (8.3)	154 (91.7)	

4.6 Association between demographic, socio-economic, nutrition knowledge, skills and practices of CHVs in educating caregivers on CF

4.6.1 Relationship between CHVs' CF knowledge and socio-economic and demographic characteristics

The current study observed significant associations between the CHVs' nutrition knowledge and their socio-economic characteristics. Associations were observed between occupation (χ^2= 15.518; p=0.008), education level (χ^2= 9.300; p=0.026), source of income (χ^2= 9.415; p= 0.024) and their knowledge (Table 4.10).

Table 4.10: Associations between CHVs nutrition knowledge and their demographic and socio-economic characteristics

Factor	χ^2	df	P value
Sex	3.583	1	0.071
Age	7.454	4	0.114
Marital status	7.124	3	0.068
Occupation	15.518	5	**0.008***
Education level	9.300	3	**0.026***
Religion	1.019	1	0.324
Household size	3.139	2	0.208
Source of income	9.415	3	**0.024***
Average household income	0.119	2	0.942

* Significant association (p< 0.05)

Logistic regression (adjusted for variables with p value < 0.1 at bivariate association) further revealed that those who were employed had 1.632 times chance to have poor knowledge in comparison with causal labourers (AOR = 1.632, C. I; 1.229 - 8.248, p< 0.001). With regards to education, those who had primary education had 3.358 times likelihood of having poor knowledge in comparison with those in college (AOR = 3.358, C. I; 1.065 - 10.590; p=0.039). Furthermore, those who reported farming as

their main income source, had 3.5 times probability of having good knowledge as opposed to those whose income was from casual labour (AOR = 3.500, C. I; 0.914 - 13.408; p= 0.044) (Table 4.12).

4.6.2 Associations between CHVs skills and their demographic and socio-economic characteristics

Chi-square test revealed associations between the CHVs skills and their occupation (χ^2= 17.400; p=0.004). Significant associations were also noted between the CHVs skills and their education level (χ^2= 15.835; p= 0.001) Table 4.11.

Table 4.11: Associations between CHVs skills and demographic and socio-economic characteristics

Factor	χ^2	df	P value
Sex	0.849	1	0.350
Age	1.967	4	0.742
Marital status	4.005	3	0.261
Occupation	17.400	5	**0.004***
Education level	15.835	3	**0.001***
Religion	1.062	1	0.303
Household size	5.124	2	0.077
Source of income	4.120	3	0.249
Average household income	4.287	2	0.117

* Significant associations (p< 0.05)

After adjusting for variables with a p value of < 0.1 at the bivariate association, those in small scale trading were 3.5 times more likely to have fair skills than those in casual labour (AOR = 3.500, C. I; 0.266 – 16.045, p= 0.034). The study also observed that those CHVs with no education had 12.1 times chance of having poor skills as opposed to those who had college education (AOR = 12.1, C. I; 5.482 – 21.950, p= 0.040) Table 4.12)

Table 4.12 Relationship between Socio-economic &demographic characteristics of CHVs and knowledge, skills and practices.

	Knowledge on complementary feeding		
Category	**AOR**	**C.I**	**p value**
Socio-economic &demographic			
Occupation (Employed)	1.632	1.229-8.248	< 0.001
Education level(primary)	3.358	1.065-10.590	0.039
Source of income	3.560	0.914-13.408	0.044
Knowledge	**Practice**		
Low (0-49%)	2.632(counselling	0.760-9.109	0.027
Moderate (50-69%)	Frequency)		
High (≥70%)	4.056(No CF demonstration)	1.327-12.397	0.014
	3.795 (CF topics)	1.239-11.628	0.020s
	Skills		
Socio-economic &demographic			
Occupation (Small traders)	3.5	0.266-16.045	0.034
Education (No education)	12.1	5.482-21.950	0.045
Practices			
Counselling on CF (less topics)	45.429	20.468-89.535	0.002

4.6.3 Associations between CHVs practices and their demographic and socio-economic characteristics

Occupation (χ^2= 28.887; p = 0.017), household size (χ^2= 20.082; p= 0.003) and source of income (χ^2= 19.643; p= 0.020) were associated with the CHV's practice of household visit. Moreover, average household income (χ^2= 10.232; p= 0.006) and sex (χ^2= 5.445; p= 0.020) of the CHVs were associated with their practice of nutrition counselling and the use of demonstrations (Table 4.13).

Table 4.13: Associations between CHV's practices and demographic and economic characteristics

	Household visit			**Methods used to pass information**						**Counselling frequency**			**Number of topics on complementary feeding**		
				Nutrition counselling			**Use of demonstrations**								
Factor	χ^2	df	P value	χ^2	df	P value	χ^2	df	P value	χ^2	df	P value	χ^2	df	P value
Sex	3.165	3	0.367	0.320	1	0.572	5.445	1	**0.020***	0.330	2	0.848	0.649	1	0.473
Age	16.165	12	0.184	4.437	4	0.350	5.506	4	0.239	32.722	8	**0.001***	2.556	4	0.635
Marital status	14.996	9	0.091	2.861	3	0.414	7.419	3	0.060	15.994	6	**0.014***	6.381	3	0.094
Occupation	28.887	15	**0.017***	10.571	5	0.061	8.741	5	0.120	17.741	10	0.059	13.139	5	**0.022***
Education level	5.288	9	0.809	0.672	3	0.880	3.136	3	0.371	5.457	6	0.487	2.093	3	0.553
Religion	0.493	3	0.921	0.220	1	0.639	0.599	1	0.439	0.793	2	0.673	1.016	1	0.313
Household size	20.082	6	**0.003***	2.668	2	0.263	0.491	2	0.782	12.127	4	**0.016***	1.290	2	0.525
Source of income	19.643	9	**0.020***	2.634	3	0.452	4.840	3	0.184	13.971	6	**0.030***	1.083	3	0.781
Average household income	11.387	5	0.077	10.232	2	**0.006***	1.087	2	0.581	9.662	4	0.047	4.847	2	0.089

* Significant associations ($p < 0.05$)

The study further found associations between the CHV's age (χ^2= 32.722; p= 0.001), marital status (χ^2= 15.994; p=0.014), household size (χ^2= 12.127; p=0.016) and source of income (χ^2= 13.971; p=0.030) with their respective frequency of giving nutrition counselling. Furthermore, and as reflected in Table 4.13, the CHVs occupation (χ^2= 13.139; p=0.022) was significantly associated with the number of topics they covered when giving nutrition counselling.

4.6.4 Associations between CHVs' knowledge and skills

From chi-square test, there was no significant association between the CHV's knowledge and skills (χ^2=0.978, df=1, p=0.390). Table 4.14 presents a cross tabulation between the CHVs' nutrition knowledge on CF and their skills level. In order to do cross tabulation of CHVs' knowledge and skills, the knowledge of the CHVs was further classified into good (≥ 50%) and poor categories (< 50%).

Table 4.14: Cross tabulation of CHVs' nutrition knowledge and skills categories

		Skills		
		Poor	Fair	P value
		n (%)	n (%)	
Knowledge	Poor (< 50%)	8 (29.6%)	56 (39.7%)	0.390
	Good (≥ 50%)	19 (70.4%)	8 5(60.3)	
Total		27	141	

Furthermore, no correlation was observed between knowledge and skills score (Table 4.15).

Table 4.15: Correlation of CHVs' nutrition knowledge and skills

		Skills score	Knowledge percent
Skills score	Pearson Correlation	1	.152*
	Sig. (2-tailed)		.049
	N	168	168
Knowledge score (%)	Pearson Correlation	.152	1
	Sig. (2-tailed)	.049	
	N	168	168

4.6.5 Associations between CHVs' knowledge and practices

A significant relationship was noted between CHVs' knowledge and practices of nutrition counselling frequency (χ^2= 10.819; p =0.004), use of demonstrations (χ^2= 6.728; p=0.009) and the number of topics covered (χ^2= 6.080; p= 0.014). This is presented in Table 4.16 below.

Table 4.16: Associations between CHVs' nutrition knowledge and practices

Practice	**χ^2**	**df**	**P value**
Household visit frequency	4.201	3	0.241
Nutrition counselling	0.061	1	0.805
Frequency of nutrition counselling	10.819	2	**0.004***
Use of demonstrations	6.728	1	**0.009***
Number of topics covered	6.080	1	**0.014***

* Significant associations (p< 0.05)

Post Hoc analysis of variance (ANOVA) revealed that, the means in knowledge based on frequency of counselling were found to be significantly different (F=11.840; df= 2; p< 0.001). Those who did the counselling once (61.37) or more frequently (59.79) per month had the highest mean score as compared to those who did it less frequently (50.15) (Table 4.17). The level of knowledge could have influenced their frequency of nutrition counselling.

Table 4.17: Means in nutrition knowledge (percentage) based on frequency of nutrition counselling (Tukey B)

If yes, nutrition counselling frequency	n (%)	Subset for alpha = 0.05 p< 0.001). 1	2
Less frequent (once in two months or more)	78	50.15	
More frequently (more than once in a month)	14		59.79
Once in a month (Recommended)	70		61.37

Means for groups in homogeneous subsets are displayed.

Further analysis showed that those who did nutrition counselling on CF less frequently (not monthly) were 2.632 times more likely to have poor knowledge on CF as compared to those who did it more frequently (more than once per month) (AOR = 2.632, C.I; 0.760-9.109, p=0.027) (Table 4.18).

Chi- square test conducted to assess the association between the CHV's nutrition knowledge of CF and the use of demonstrations during counselling found a statistically significant association (χ^2= 6.728; p=0.009) between CHVs' nutrition knowledge and their practice of using demonstrations ((Table 4.18).

Independent t test revealed that the mean knowledge score between those who did demonstrations and those who did not were significantly different. Those who practiced demonstrations had a higher mean knowledge (62.12) compared to those who did not (54.81) (t value= 2.327; F= 5.915; p=0.021) (Table 4.18).

Table 4.18: Association of CHVs' nutrition knowledge, nutrition counselling frequency and use of demonstrations

		If yes, nutrition counselling frequency				
N=162		Once	Less frequently	More frequently	Total	Chi-square test
Knowledge category	Poor (< 50%)	18	40	4	62	χ^2=10.81, p= 0..004
	Good (≥ 50%)	52	38	10	100	
Total		70	78	14	162	

		Use of demonstrations	
N=162		Yes n (%)	Chi-square test
Knowledge score	Poor (n=64)	4 (15.4)	χ^2= 6.728; p =0.009
	Good (n=104)	22 (84.6)	

	Use of demonstrations	N	Mean	Std. Deviation	Std. Error Mean
Knowledge Score	No	139	54.81	15.429	1.309
	Yes	26	62.12	9.754	1.913

t value= 2.327; F= 5.915; p= 0.021

Additionally, logistic regression revealed that those who had poor CF knowledge were 4.056 times more likely not to practice demonstrations as opposed to those with good knowledge (AOR = 4.056, C. I; 1. 327 - 12.397, p=0.014). The number of topics covered by the CHVs were also associated with their nutrition knowledge on CF. (Table 4.19)

Table 4.19: Association between CHVs' knowledge and number of topics covered

		Number of topics covered		Odds Ratio		
		Below 4	4 and above	AOR	CI	P
Knowledge score	Poor (<50%)	n (%) 60 (41.9)	n (%) 4 (16)	4.056	1.327-12.397	0.014
	Good (≥ 50%)	83 (58.1)	21 (84)			

Comparison of knowledge means between those who covered below 4 topics and those who covered 4 topics and above was done. The means were found to be significantly different (t value = 1.455; F = 1.327, p=0.025) (Table 4.20). Regression analysis revealed that CHVs with poor knowledge on CF were 3.795 times more likely to cover less than 4 topics as compared to those who had good knowledge (OR = 3.795, C. I; 1. 239 - 11.628, p = 0.020).

Table 4.20: CHVs' mean nutrition knowledge based on the number of topics covered

	Number of topics	N	Mean	Std. Deviation	Std. Error Mean
Knowledge percentage	Below 4	143	55.06	15.299	1.279
	4 and above	25	59.80	13.248	2.650

t value= 1.455; F= 1.327; p value = 0.025

4.6.6 Associations between CHVs' skills and their practices on CF

Associations between the CHVs' skills and their practices was further established (Table 4.21). A notable association was found between the CHVs' skills and number of topics covered during counselling (χ^2= 4.311**;** p=0.015).

Table 4.21: Associations of CHVs skills and their practices

Practice	χ^2	**P value**
Household visit frequency	6.143	0.093
Nutrition counselling	3.896	0.053
Frequency of nutrition counselling	1.260	0.533
Demonstrations	0.011	0.918
Number of topics covered	4.311	**0.015***

Adjusted for practices with a p value of < 0.1 at the bivariate association, CHVs who had fair skills had 45.429 times probability of having covered four topics and above contrary to those with poor skills (AOR = 45.429, C. I; 20.468 - 89.535, p=0.002) (Table 4.22).

Table 4.22: Relationship between CHVs' skills and number of topics

		Number of topics		Odds Ratio		
		Below 4	4 and above	AOR	CI	P value
Skills category		n (%)	n (%)	45.43	20.47-89.54	0.002
	Poor	27 (18.9)	0			
	Fair	116 (81)	25(100)			

4.7 Challenges faced by CHVs when educating caregivers on complementary feeding

Focus group discussion consisting of 8-12 CHVs was conducted to illicit important information on the challenges faced by the CHVs on CF.

A major challenge encountered by the CHVs was lack of funds to pay for their transport as they moved to and from their allocated households. The area is sparsely populated and they moved for long distances to reach the households as indicated below by one CHV during FGD; '*The houses are far much apart from one another and so we walk a lot. If somebody has some money to pay for motorbike, then it is very easy but we are not paid so we just visit the nearby households*. FGD participant, Masinga, 2019.

The CHVs reported that the County Government promised them a stipend to cater for their transport but they received it once. They also complained that it was not enough. FGD 2019 *'The county government promised to be giving us some stipend to facilitate our movement but we were paid only for one month and when we ask, they tell us to wait. This work is hard",* FGD participant, Masinga, 2019.

Another challenge that was mentioned frequently by the CHVs was lack of identification. They said they required something to help them be identified by the

community as CHVs representing the health sector. This identification included badges or a form of uniform. They said some community members did not recognize them as genuine and they kept on explaining themselves.

The CHVs have many households to handle and this makes it a challenge to visit all of them. As explained by one health worker during a key informant interview session. "*These CHVs have a lot of work to do. One CHV with a hundred plus households to visit and they are not paid, they feel demotivated. The County Government promised to pay some stipend but it is not yet stable as they were only paid once. Others stopped reporting,''* KII participant, Masinga, 2019.

CHVs lack adequate knowledge on CF and they don't have materials that can help them such as counselling cards. This makes them lack confidence. Another challenge that was reported was resistance and being looked down upon by the community. "*Some people ask and wonder why we say we are community health volunteers yet we are colleagues from the same village and when we tell them about a healthy behaviour, they are resistant to that change. There are other religious sects like Kavonokya who don't support health services but at least there are some community members who comply to what we tell them so they make us move on with our work",* FGD participant, Masinga, 2019.

Poverty experienced by majority of the community members is another challenge. When the CHVs advise the caregivers about the foods they should give to their children, they say they cannot afford to buy those foods. This demoralizes the CHVs because what they communicate is not implemented well.

CHAPTER FIVE: DISCUSSION

5.0 Introduction

This chapter discusses the findings of the current study and compares them with other related studies. The results are discussed in accordance with study objectives.

5.1 Socio-economic and demographic characteristics of the CHVs

Majority of the CHVs were females (73.8%). This could be attributed to the fact that females are more likely to be available to serve the community compared to their male counterparts who might get involved in income generating activities as bread winners. Females, being mothers, are naturally caring for their children and therefore likely to share their experiences with their fellow community members (Vizeshfa et al., 2019). This study agrees with a research carried in Njiru District, Kenya that stated that a big number of the CHVs were females (80%) as their community have faith in them compared to the male CHVs (Margaret, 2014). Majority (79%) of the CHVs were married. This marital status is socially accepted by the community and hence the reason why most of them are recruited as CHVs. Kithuka (2016) reported that, married CHVs can afford some cash to pay for their transport to do household visits as they get financial support from their spouses since no stipulated support comes from the government.

The mean age for the CHVs was 46.64 years (SD=10.9) and majority were in the 41-50 years age bracket. This age group is mainly characterized by less child caring responsibilities and therefore likely to have time to volunteer and serve the community. Melvin et al. (2017) reported that older CHVs like their work as opposed to the young ones who are driven by the anxiety to look for other jobs. The current

study findings also concurred with Yoshito et al. (2012) in a survey on determinants on CHVs activities in Kisumu, Kenya who said that, with adequate support, more mature CHVs had a high chance of performing well. The current findings however, contradicts that of Ndedda et al. (2012) that indicated that those aged 30-39 years were more sustained and therefore good for recruitment. As pertains to their education level, majority (56.5%) had received primary education.. However, Margaret (2014) contradicts this observation in his study done in Njiru district, Kenya on performance of CHVs which showed that majority of CHVs had attained secondary education. A big number of CHVs relied on less than Ksh 10,000 per month to meet their household needs.

5.2 Training of CHVs on CF of children aged 6-23 months.

More than three quarters (87%) of CHVs were trained on CF. However, the training period differed based on the partner supporting the community units. Majority (67.5%) were trained by NGOs. The current findings contradicts that of Margaret (2014) in her study done in Njiru, Kenya where she stated that more than half of CHVs were trained by MOH. Majority (63.3%) were trained for some hours with only 24.4% being trained for 2-3 days. The training period for most of the CHVs was inadequate to cover all topics in CF adequately. As indicated by Kithuka (2016), the training offered to CHVs immediately after selection of less than two weeks, was not enough to promote success in CHVs activities. Other studies documented that training in Kenya, Uganda and Tanzania for CHVs took 2-4 weeks which covered health issues in general and not all CHVs received this training (Nzomo, 2013; Aseyo et al., 2018).

The coverage of the training was further investigated. Nearly a third (26.9%) were trained on types of food to give to children and almost equal numbers were trained on variety and hygiene. Less than 10% of the CHVs were trained on frequency, amount of food and responsive feeding. It was also noted that the training on CF was done without much emphasis on different age groups. Aseyo et al. (2018), in his study on realities and experiences of CHVs stated a similar situation where each CHV reported different topic areas of training and different lengths and formats of training. Similar findings were observed where only a little more than a third of the CHVs in a Brazilian study on CF reported having received training on CF (Dos Santos et al., 2017).

Purvi et al. (2011) agrees with results of this research. He reported that, CHVs recommended lesser quantity of food for children 12-23 months and only few recommended caregivers to encourage their children to feed through play. According to walker et al. (2013), complementary training modules and one-off training coupled with refresher training are valuable in building skills and professional advancement. However, they should be allocated adequate time to help build the knowledge base and skills for the CHVs to be able to deliver optimal CF messages. Furthermore, when frequent remindance is not done, received skills and knowledge are easily forgotten, and this can negatively affect their duties (Aseyo et al., 2018).

5.3 Knowledge of CHVs on complementary feeding.

The Knowledge level of the CHVs on CF aspects was moderate (66.1%). This could be because by the time of data collection several NGOs in partnership with MOH had conducted some training to the CHVs. The CHVs were knowledgeable on the age of

initiation of CF and dangers associated with early initiation of CF. The observations in this study are similar to findings by Purvi (2011) on knowledge and perceptions of CHVs on CF. He reported that their knowledge level on CF was average with majority knowing the time of initiation of CF. Other studies that collaborated with this study were conducted by Dos santos et al. (2017) and Mwoma et al. (2020). The two surveys analyzed CHVs' knowledge on the feeding of children up to two years of age and verified that the module score based on breastfeeding was higher than the score of CF. Mieke (2007) however, stated that CHVs in Kwa Zulu Natal in South Africa thought the initiation of CF was between 4-6 months of age.

The current study also observed that, knowledge on dietary diversity was average (66.7%) as most of the CHVs were not knowledgeable on the amount of food to give at specific age categories as well as the frequency. Mieke (2007) and Mwoma et al. (2020) reported that CHVs are main source of nutrition information on CF for caregivers, and it is therefore important that the latter have adequate knowledge of infant nutrition especially on amounts and frequency.

5.4 CHVs' counselling skills to caregivers on CF

For behaviour change to be effective, interpersonal communication and delivery of key messages is vital. Some studies showed that training in communication skills enabled CHVs to promote behaviour change in the community and increased their confidence in healthy behaviour (Hall et al., 2017; Mirkuzie, 2018). From our study, the counselling skills' mean score of the CHVs was 0.84 (SD=0.368). The CHVs were either poor or fair with majority (83.9%) being fair ranked on a scale of poor (0),

fair (1) and good (2). Some of the fair counselling skills observed were: creation of rapport with caregivers, paying attention to caregivers and encouraging them to talk.

Use of non-verbal communication was poorly done. Similar studies on CHVs have mentioned few counselling skills, only few mentioned role modelling and rapport-building (Aseyo et al., 2018: Ngoma et al., 2018). CHVs being known to the community members could to some extend create fair environment for communication to the clients although more skills are still required in this area. Mwoma et al. (2020) collaborates with our study where she found that CHVs knew the need to create rapport before counselling sessions.

In delivery of key messages on CF, local foods that constitute the seven food groups was explained fairly well by 53% of the CHVs. Amount of food to give, frequency, food thickness and responsive feeding were poorly explained to caregivers. This agrees with a document by Purvi et al. (2011) who reported that, only 33% of CHVs mentioned frequency, quantity and consistency of CF in his study. Other studies attest that if CHVs are given the right skills and communication materials, they can help in reducing the risk of malnutrition in young children (Ngoma et al., 2018). A minimum standard for continuing education should be established to ensure CHVs retain competencies and advance in new skill development (Walker et al., 2013).

5.5 Nutrition methods used to pass CF messages to caregivers

5.5.1 Home visits and nutrition counselling to caregivers

One main role of CHVs in Kenya is to conduct household visits within their area of coverage (Prabhjot et al., 2014). Through household visits, CHVs are able to

communicate any health behaviour (Nkonki et al., 2017). The current study found that only 43.5% of CHVs visited households at least once in a month as expected by the MOH. Literature also concurs with this study that these cadre of health teams are in charge of visiting families at least once a month, and developing health activities through home visits and individual and/or group educational actions. (Gilmore et al., 2013: Nzomo, 2013). The area of study is sparsely populated and majority of CHVs could not afford to pay for their transport to reach every household. As documented by Ngoma (2018), there is an expense incurred by CHVs while doing nutrition advocacy during household visits and this calls for additional resources.

More than three quarters (83.5%) of CHVs reported that they used nutrition counselling as a way of passing CF messages to care givers as it was the easiest way to communicate to caregivers. CHV said, "When *I reach the household, I request for permission to talk to the mother of the child for a moment. When she allows me, we discuss just about how to feed the child and we agree on what can be done for child to grow well. I do this for any other information I want to pass across".* FGD participant, Masinga, 2019.

Although a big number of CHVs said they used nutrition counselling to pass CF messages to caregivers, only 41.7% do it at least once in a month with 46.4% doing it less frequently. The CHVs are tasked with several areas to talk about and this made them alternate the topics during the household visits. (Probhjot, 2014). Other studies have shown similar approaches where the CHV builds self-awareness among participants and provides them with education about maternal and neonatal health through a participatory learning and action cycle (Henry et al., 2014). This implies

that support supervision by SCHMT is required to ensure that CHVs have a schedule of visiting the households and are able to counsel the caregivers on different health topics in an organized manner.

Much evidence about nutrition counselling has been documented by Mwoma in a study about incorporating early childhood development in BFCI in rural Kenya where the findings suggested that the CHVs were able to incorporate counselling on optimal infant feeding practices in their work (Mwoma et al., 2020). Published reports have demonstrated declines of under-5 mortality by 30% as well as marked reductions in child under nutrition through health education by CHVs (Henry, 2013: Murage et al., 2015). There is, therefore, scientific evidence that it is worthwhile to invest in providing CHVs with specific skills to support care through counselling caregivers (Achola et al., 2012).

5.5.2 Topics discussed during nutrition counselling of caregivers on CF.

Our study further investigated the topics covered on CF during nutrition counselling. Food variety and food hygiene were mostly discussed by the CHVs during nutrition counselling. The least discussed were those on food preparation and on responsive feeding. Amount to feed to children, frequency of the feeds and food thickness were also not done well. This contradicts a report on CHVs counselling where caregivers reported that CHVs taught them how to feed their children little by little through giving different foods (Mwoma et al., 2020). In a research by Keding et al. (2015), CHVs participated in counselling caregivers on food diversification in preparation of complementary foods.

5.5.3 Nutrition demonstrations, role plays and use of job aids by CHVs

Although part of CHVs' roles is to do nutrition demonstrations alongside home visits (Nzomo, 2013), this study found that, nutrition demonstration was done by only 13.4% of the CHVs. Less than half (24.4%) of them used nutrition demonstration at least once in month and only 3% used role plays. A report documented by Biodiversity International indicated that CHVs in Western Kenya used nutrition demonstrations alongside nutrition counselling although use of flesh foods in CF was still a challenge despite the nutrition education (Keding et al., 2015: Nkonki et al., 2017). There is limited literature on use of role plays by CHVs to pass CF messages to caregivers.

As regards to use of Job Aids, only 26.2% of the CHVs had CF MIYCN counselling cards to help them in delivery of CF messages. Studies done on CF in low and middle-income countries, showed that efforts should be made to ensure that CHVs have access to materials and encourage reading, understanding and appropriation of the contents. So far, few mentioned knowing about the existence of the CF materials, (Dos Santos et al., 2017). Furthermore, non-financial incentives and job aids should be awarded under agreement of the local or national authority (Walker et al., 2013). A recent study by Mwoma et al. (2020) supports this study by indicating that the use of counselling cards with more visual cues than words was preferred by the CHVs, as this would simplify the messages and make them easier to understand.

5.6 Follow-up of caregivers by CHVs

Once caregivers are counselled on CF, it is imperative that they are followed up to ensure that they implement what was taught effectively. Our study found that more

than three quarters (89.3%) of the CHVs followed up the caregivers who they counselled. Driven by their motive to help the community, most of the CHVs would like to see positive progress to their peer families which can only be done through follow-up visits (Aseyo et al., 2018). Frequent follow- up could be hindered by challenges such as lack of funds to pay for their transport as there is no regular stipend given to the CHVs.

5.7 Challenges faced by the CHVs

Lack of transport is one of the challenges mentioned by almost all the CHVs in the study area. Without means of transport or funds to pay for transport, it is very difficult for them to visit all the assigned number of households and this affects negatively the CHVs' willingness to work leading to poor results (Margaret, 2014). For instance, in Malawi, lack of money to pay for transport hindered some CHVs from reaching all their catchment area (Melvin et al, 2017). This challenge is compounded by the fact that the CHVs do not receive any stipend for their work despite having been promised by the county government some money on regular basis. Similar studies on CHVs' programs also concur with this study which documented that, six out of 16 CHVs mentioned that it was difficult to devote time to work without any government allowances (Nkonki et al., 2017). In another study, CHVs said that they were likely to devote more time to CHVs' activities if they received a reasonable incentive that could sustain their livelihoods even if it's from NGOs (Henry et al., 2014). The MOH recommends that CHVs visit household at least once in a month and do counselling on health issues but this work is impended by transport challenges.

The CHVs mentioned lack of identification such as badges or uniforms. This made it difficult to be recognized by their community members as health representatives. Another gap mentioned in our study is inadequate knowledge on CF as well as lack of Job Aids. As mentioned by one of the health workers in key informant interview*; "The CHVs are not very conversant with CF areas and so if they can receive refresher training on amounts of food to give, variety and many other topics then they can be our good ambassadors of good health in the community.*" KII participant, Masinga, 2019.

Therefore there is need to conduct regular refresher training to CHVs on CF to ensure that the knowledge acquired is not lost.

Mwoma et al. (2020) concurs with this study where her study documented that a gap in the knowledge around maternal infant and young child nutrition was noted among the CHVs, particularly with regard to CF. The issue of inadequate training has been supported by walker et al. (2013) in his study on 'CHVs' Principle of Practice' where it stated that lack of ongoing trainings and professional development as well as availability of CF materials were among the barriers to effective performance of CHVs.

CHVs' programs have faced many challenges that must be overcome, including lack of adequate supervision and logistical support, all leading to reduced motivation to perform their work (Henry et al., 2014). It is important therefore, to provide supportive supervision as well as not burdening CHVs with too many new parameters. However, the cost of this 'extra' supervision needs to be ascertained to

ensure that this would be feasible given the available resources in Kenya (Mwoma et al., 2020).

5.8 Relationship between knowledge and socio-economic and demographic characteristics of CHVs

A notable association ($p < 0.05$) was noted between knowledge and socio-economic characteristics of the CHVs. Occupation, education and source of income were significantly linked to knowledge. Those employed had 1.632 times chance of having poor knowledge contrary to casual labourers. This could be attributed to fact that those employed are more committed to the job and may not have adequate time to attend refresher training and hence the low knowledge level. Likewise, the primary school leavers had 0.358 times probability of having poor knowledge than those whose education level was up to college. Those with higher education background will have better understanding of concepts during training and this will translate to higher knowledge of the content (Melvin et al., 2017).

This current findings concurs with that done in Brazil on CHVs as interlocutor of CF which indicated that those who had elementary secondary education and above had high knowledge on CF compared to those with low level of education (Dos Santos et al., 2017). More education impacts positively on CHVs performance (Melvin et al., 2017). Education background should therefore be a key consideration during recruitment of CHVs.

CHVs who were farmers from the group had 3.5 times likelihood of having good knowledge in comparison with casual labourers. Although no much literature

explaining the reason for this, it is likely that farmers are self-employed and responsible of their farms and can therefore create time for themselves and attend CF refresher trainings which were noted from this study that they take 1-3 days or few hours. Casual labourers on the other hand may not predict when they will get a job which may be based on luck and therefore miss out on the CF refresher trainings if the job comes up. Other socio-economic and demographic characteristics did not have significant association with the knowledge of CHVs.

5.9 Relationship between knowledge and practices used by CHVs in educating care givers in CF of children aged 6-23months

A strong link ($P < 0.05$) was noticed between CHVs' CF knowledge and their respective practices of nutrition counselling frequency, use of nutrition demonstration and number of topics covered during counselling. Those who did nutrition counselling less frequently had 2.632 times chance of having poor knowledge contrary to the ones who managed it more frequently. Frequent nutrition counselling would perfect their knowledge on CF as they are able to refer or consult more if they make mistakes than those who do counselling less frequently.

Independent t-test revealed that those who practiced nutrition demonstration had a higher (62.12) mean knowledge compared to those who did not (54.81). Further analysis showed that those who did not practice demonstrations were 4.056 times more likely to have poor knowledge. High knowledge on CF would make CHVs more confident enough to go ahead and demonstrate to caregivers to understand the concept more clearly. The effect of nutrition counselling and demonstrations has also been supported by a research done in Western Kenya which stated that after training

sessions and demonstrations by CHVs, mothers' knowledge improved and children were fed on diversified foods (Keding et al., 2015).

In terms of topics covered, those who had poor knowledge score on CF were 3.795 times more likely to cover less than four topics on CF during counselling compared to those who have good knowledge. A knowledgeable CHV is likely to give more information to caregivers compared to the one who is less knowledgeable who may be limited with information. From our study, it is clear that knowledge on CF will determine how frequent the CHVs will pass the information to caregivers, whether they will do nutrition demonstrations or not and the number of topics to be covered during the counselling. Adequate resources should therefore be channeled towards training to ensure adequate knowledge on CF is achieved by this CHVs.

5.10 Relationship between counselling skills and practices of CHVs in educating caregivers on CF

Our study also determined association between counselling skills of the CHVs and the methods they used to pass CF messages to caregivers. An association was observed between the CHVs' skills and the number of topics they covered. Skills are necessary in determining how deep the CHV will cover regardless of the strategy used in delivery of the CF message. However, practices such as, nutrition counselling, frequency of nutrition counselling and use of nutrition demonstration did not have association with the skills of the CHVs.

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of key findings

Majority of the CHVs were females, had attained primary level of education and their main source of income was farming. Majority (79%) of the CHVs were married. This marital status is like;y to be socially accepted by the community and hence the reason why most of them are recruited as CHVs. Training of CHVs is important in enhancing knowledge, practices and skills. Majority of the respondents had attended a training on CF lasting less than three days which was mainly conducted by NGOs. The coverage of the training was biased on food variety and hygiene with the content on food frequency, amount, adequacy and responsive feeding inadequately done.

Their knowledge level on CF was moderate (50-69%). Less than half of the CHVs conducted household visits at least once in a month as expected by the Kenya's community strategy and majority of those who visited households used nutrition counselling as the strategy of passing CF. Cooking/feeding demonstrations and role plays were rarely used with some CHVs not using any of the methods. The CHVs were fair in terms of their counselling skills on CF. A key observation was that majority were not able to create rapport with the caregivers and had challenges in delivering key messages to caregivers on CF. This could be linked to poor training in both CF content as well as on counselling.

A significant association was noted between knowledge and the practices used by CHVs in passing CF messages to caregivers. Those with poor knowledge did nutrition counselling less frequently and handled less than four topics during counselling compared to those with high knowledge. Furthermore, those with high knowledge

were able to do nutrition demonstration compared to those with low knowledge. However, no strong relationship was noted linking knowledge and skills and this implies that a training on counselling skills on CF is key for the CHVs to be able to pass CF information to caregivers optimally.

6.2 Conclusion

From the current study findings, it is notable that majority of the CHVs receive inadequate training on CF and refresher trainings are rarely conducted if any. The training duration and content is therefore inadequate to equip the CHVs with right knowledge on CF. This study rates the knowledge of the CHVs as moderate and concludes that it is sub-optimal to promote appropriate CF within the community they serve. Counselling skills' score indicated that CHVs possessed fair skills implying that they lack some practical skills to execute their duties. This was not only for the general counselling skills but also on delivery of CF key messages to caregivers.

The practices used by the CHVs to pass CF messages at household level were inadequate as less than half of the CHVs used nutrition counselling with minimal number using nutrition demonstration and role plays. Even with the use of these practices, the CF content covered was sub-optimal which could also be as a result of lack of appropriate counselling cards as also realized from this study. The CHVs face a number of challenges which are impeding factors to their performance in health activities including promotion of adequate and effective CF practices in the communities they serve. Concerted efforts from both MOH and partners in health is therefore required to ensure the existing curriculum on community strategy is reviewed to include adequate information of CF, counselling skills and also provide

MIYCN counselling cards for all the CHVs. Existing policy on community strategy should also be reviewed to put in place modalities by which CHVs can be motivated.

From our study, a strong link was noted between CF knowledge of CHVs and their occupation, education level and source of income. This implies that that some level of education and an income generating activity are important considerations in CHVs' recruitment as they will affect their understanding and retention of CF concept and also affect their frequency of household visits. The null hypotheses 'there is no significant relationship between socio-economic and demographic characteristics of CHVs' and their CF knowledge' is therefore rejected.

The study further revealed that there was a significant association between knowledge of CHVs and nutrition counselling frequency and number of topics done and therefore knowledge on CF in key as it will determine how well the messages will be conveyed to the receiver. More still, there was an association noted between knowledge of CHVs on CF and use of nutrition demonstration and therefore knowledge contributes to their confidence and hence more strategies will be used to pass CF message to the caregivers. Since there is significant association between practices and the knowledge of CHVs on CF, the second hypotheses 'there is no significant relationship between knowledge and practices of CHVs in educating caregivers on CF of children aged 6-23 months,' is also rejected.

This study found that, there was no association between CF knowledge and skills among the CHVs an indication that CF knowledge does not always translate to skills

and therefore a detailed training on skills should be included in the training curriculum for CHVs.

However, an association was noted between CHVs' skills and the number of topics discussed during nutrition counselling. Community health volunteers who were more skilled did nutrition counselling on many topics than those poorly skilled. Skills on CF means intensity on the content covered during counselling of caregivers by the CHVs and it is very relevant in delivery of CF messages to caregivers. The third null hypothesis 'there is no significant relationship between Skills and practices of CHVs in educating caregivers on CF of children aged 6-23 months is also rejected.

6.3. Recommendations

Recommendation for policy

The MOH and stakeholders involved in health should develop policy guidelines that will streamline motivation of CHVs through the payment of regular and consistent stipend.

Recommendations for practice

1. The MOH should enhance the current training curriculum for the CHVs to equip them with adequate knowledge and counselling skills on CF. The MOH and partners in health should also review the training period to allow for a comprehensive coverage on CF. The training should also offer practical counselling skills on CF.

2. The MOH should evaluate CHVs competence after training in order for them to pass CF messages to caregivers appropriately

3. The MOH and partners should equip CHVs with MIYCN counselling cards and other relevant CF materials.

4. The Sub-County Health Management Team (SCHMT) should develop a work plan for the CHVs to adequately cover all health topics including CF.

Further research recommendations

1. This study recommends further research on effect of training on competence of CHVs and the outcomes on CF among children aged 6-23 months.

2. Further research is also needed to determine factors affecting CHVs' performance in supporting caregivers on CF.

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APPENDICES

APPENDIX A: PARTICIPANTS CONSENT

Participant,

My name is Susan Kivaya, a post graduate at Kenyatta University undertaking a Food, Nutrition and Dietetics degree (Msc). I am conducting a study on CHVs' Knowledge, skills and practices on CF of children aged between 6-23 months.

Study procedures

You will be asked questions about your demographic and socio-economic factors, knowledge, skills, training as well as practices on CF. Questions on the challenges you face as you pass the messages to caregivers will also be asked. All the responses will be recorded and the interview will take 20-30 minutes.

Benefits and compensation

No financial gain will be received by engaging in the study. By participating however, you will assist the ministry of health both National and County level in coming up with training curricula that will capture CF information which will then be useful to you and the community at large. Through your participation, gaps and challenges you face in passing complementary feeding information to caregivers will also be identified and solutions will be obtained as well.

Voluntary participation

Participation is optional. However, by participating, you will greatly contribute to the success and impact of the study.

Confidentiality

The information you give will only be used for this study and will not be discussed with other people other than those concerned with the study. After the study, the

questionnaires will be coded and locked in a cabinet to prevent accessibility by unauthorized persons.

Participant's statement

I agree……. or disagree…….to take part in the study

Everything about the study is well described to me and confidentiality assured. My participation will be voluntary and no incentives will be offered to me.

Participants code……Signature/thumbprint……

Date

Questioner's statement

As the interviewer, I have put across everything about the study to the respondent in an understandable language.

Interviewer's name: Signature……. Date: …

Contact Person

If you have any question(s), or concern you may contact:

Susan K. Kivaya

Mobile Number: 0715 178 724

Email: suekk22@gmail.com

And

Kenyatta University Ethical Review Committee:

Email Address:http://research.ku.ac.ke/dvc-rio@ku.ac.ke

APPENDIX B: RESEACHER ADMINISTERED QUESTIONNAIRE

SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE CHVs

Date of Interview……

	QUESTION	RESPONSES	CHOICES
B1	Gender	Male Female	1 2
B2	Age	…….	
B3	Marital status	Single Married Separated Widowed	1 2 3 4
B4	Source of livelihood	Employed(salaried) Merchant/trader Small scale trading e.g. sell of charcoal, vegetable kiosk Farming Any other (specify) None	1 2 3 4 5 6
B5	Education level	No education Primary Secondary University	1 2 3 4

		College	5
B6	What is your religion	Christian Muslim None	1 2 3
B7	Size of household	…….....	
B8	Number of children	……	
B9	Young children aged under five years	……	
B10	Main source of livelihood	Salaried job Farming Small business Other source	1 2 3 4
B11	What is your average monthly income in Ksh?	Ksh.....	

CHVs KNOWLEDGE AND TRAINING ON COMPLEMENTARY FEEDING

	Questions	**Responses**	**Choices**
	Section 1: Training		
C1	Did you receive any training on CF?	Yes No DNK	1 2 3
C2	If yes in C1, which organization trained you? (Specify)	MOH NGO Any other	1 2 3
C3	If yes in C 1, how long was the training?	Hours Days One week and above	1 2 3
C4	Which topics did the training cover? (Don't read the choices)	Types of food Frequency Amount Texture Variety Adequacy Hygiene Responsive feeding Other topic	1 2 3 4 5 6 7 8 9

	Section 2: Knowledge		
C5	CF begins after six months.	Yes No DNK	1 2 3
C6	If babies are fed before six months can become sick	Yes No DNK	1 2 3
C7	If babies delay in eating (eg at eight months) may become undernourished	Yes No DNK	1 2 3
C8	Solid and semi-solid foods are examples of complementary foods	Yes No DNK	1 2 3
C9	Babies 6-23 months old eat 2-3 meals plus snacks	Yes No DNK	1 2 3
C10	Children (6-23 months) should eat different types of foods	Yes No DNK	1 2 3
C11	Mothers should breastfeed their babies for at least two years	Yes No	1 2

		DNK	3
C12	Mothers should encourage their babies to eat even when they don't want	Yes No DNK	1 2 3
C13.	Sick babies should eat more even after the illness is over	Yes No DNK	1 2 3
C14	Babies food should be improved nutritionally (e.g porridge with oil or/and sugar)	Yes No DNK	1 2 3
C15	How many times should a breastfeeding child aged 6 months feed?	2-3 times Once DNK	1 2 3
C16	How much food should a child aged 6 months take?	2-3 Table spoons 1 table spoon DNK	1 2 3
C17	What amount of food should a child aged 7-8 months take?	½ cup Full cup DNK	1 2 3
C18	How many times should a child aged 7-8 months feed?	3 times 2 times DNK	1 2 3
C19	How frequently should a child	4 times	1

	aged 9-11 months feed?	2 times DNK	2 3
C20	What amount of food should a child aged 12-23 months take?	1 cup ½ cup DNK	1 2 3
C21	How many times should a child aged 12-23 months feed?	5 times 1 times 2 DNK	1 2 3

CHVS' PRACTICES

	QUESTION	RESPONSES	CHOICES
E1	How often in a month do you visit the households within your area of coverage?	None Once More frequent Less frequent	1 2 3 4
E2	What strategies do you use to pass complementary feeding information to caregivers?	Nutrition counselling Demonstrations Role plays Others(specify) none	1 2 3 4 5
E3	If there are strategies mentioned in E3 above, how often in a month do you do nutrition counselling?	Once More frequent Less frequent Not done	1 2 3 4
E4	Which specific topics do you discuss in CF?	Start of CF Size of food to give Number of meals per day Thickness of the food Variety Hygiene Responsive feeding Any (other specify)	1 2 3 4 5 6 7 8

E5	How often in a month do you conduct feeding or cooking demonstrations?	Once More frequent Not done	1 2 3
E6	How frequent in a month do you do role plays on complementary feeding?	Once More frequent Not done	1 2 3
E7	Do you do follow-ups to the clients counselled on complementary feeding	Yes No	1 2
E8	Do you have job aids on complementary feeding?	Yes No	1 2

APPENDIX C: OBSERVATION CHECKLIST ON COUNSELLING SKILLS OF CHVs

Observe a CHV during counselling and score as follows: 0- Poor, 1-Fair, 2-Good, **1.Use of Communication and presentation skills**			
		Score	
D1	Introduction and request for permission		
D2	Passes friendly remarks		
D3	Pays attention to the caregiver		
D4	Encourages caregivers to talk		
D5	Positive non-verbal communication and body language		
2. Delivery of Key messages			
D6	Start of complementary feeding and why this time		
D7	Amount of food given to a breastfeeding child aged 6 months, 7-8 months,9-11months and 12-23 months (score what is applicable)		
D8	Frequency of feeding a breastfeeding child aged 6 months, 7-8 months,9-11months and 12-23 months (score what is applicable)		
D9	Local foods that constitute a balanced diet		
D10	Thickness of the child's food		
D11	Enrichment of child's food		
D12	Hygiene and food safety		
D13	Responsive feeding		

D14	Recommends changes in inappropriate feeding practice		
D15	Explains why changes have to be done		
D16	Summary of Key issues		

APPENDIX D: CHVs FOCUS GROUP DISCUSSION GUIDE

1. Please describe the feeding practices in this community in terms of:
    a. Age at introduction of CF.
    b. Why at this time?
    c. What are the most common foods fed to children 6 – 23 months old in this community?
    d. Are there foods that are not suitable for children aged 6-23 months?
2. What is a balanced diet?
3. Does a child need to get these foods and why?
    a) Fruit
    b) Vegetable
    c) Meat/fish/eggs
4. Do care givers manage to give these foods yes/no.? How often?
5. What are the main difficulties that are encountered by caregivers in providing a balanced diet to a baby?
6. Where do care givers receive information from regarding CF?
7. What information do you communicate to the care givers regarding CF?
8. In your opinion, do you think you have enough training/are knowledgeable on child feeding? If no, what do you lack?
9. What CF messages need to be emphasized and why?
10. What motivates you to do your work?
11. Do you get any compensation/reward for your work? What form of reward?
12. What challenges do you encounter when passing CF messages to caregivers?

APPENDIX E: KEY INFORMANT INTERVIEW WITH HEALTH WORKERS

1. Where do caregivers get information from regarding CF?
2. Do community health volunteers give CF information to caregivers. If yes, how do they do this? (probe)
3. Which message is mainly passed by CHVs to mothers concerning CF.
4. Do CHVs have job aids. If yes, what type of job aids?
5. In your opinion, do you think CHVs have enough information/are knowledgeable on child feeding? If no, what information do they lack?
6. Are mothers getting the right message concerning CF.
7. What CF information require highlighting. Why?
8. What challenges are encountered by CHVs when passing CF messages to care givers?

APPENDIX F: THESIS BUDGET

Activity	**Quantity**	**Unit cost Ksh**	**Totals Ksh**
Concept paper binding	10 copies	100	400
Proposal writing, binding	6 copies	500	3,000
Instruments for pre testing	40 copies	50	2,000
Data collection instruments	200 copies	50	10,000
Training of research enumerators	2 Enumerators	1000	2,000
Data collection	14 days	5200	72,800
Data coding, entry and analysis	10days	5000	50,000
Printing & binding of thesis	10 Copies	1000	10,000
Miscellaneous			10,000
Grand total (Ksh.)			**160,000**

APPENDIX G: MAP OF MASINGA SUB COUNTY

DHIS, 2020

APPENDIX H: RESEARCH PERMIT AND LETTER OF AUTHORIZATION FROM NACOSTI

THIS IS TO CERTIFY THAT:
MISS. SUSAN KATUNGE KIVAYA
of KENYATTA UNIVERSITY, 0-90119
MATUU,has been permitted to conduct
research in *Machakos County*

on the topic: *COMPETENCY OF COMMUNITY HEALTH VOLUNTEERS ON COMPLEMENTARY FEEDING STRATEGIES OF CHILDREN 6-23 MONTHS IN MASINGA, MACHAKOS COUNTY, KENYA*

for the period ending:
17th January,2020

.....
Applicant's Signature

Permit No : NACOSTI/P/19/49835/27440
Date Of Issue : 17th January,2019
Fee Recieved :Ksh 1000

.....
Director General
National Commission for Science, Technology & Innovation

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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2241349,3310571,2219420
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Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/19/49835/27440**

Date: **17th January, 2019**

Susan Katunge Kivaya
Kenyatta University
P. O Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Competency of community health volunteers on complementary feeding strategies of children 6-23 months in Masinga, Machakos County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Machakos County** for the period ending **17th January, 2020.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Machakos County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Machakos County.

The County Director of Education
Machakos County.

APPENDIX I: PERMISSION LETTER FROM CHMT

REPUBLIC OF KENYA

GOVERNMENT OF MACHAKOS COUNTY
DEPARTMENT OF HEALTH & EMERGENCY SERVICES

Telephone: +254-44-20575
Fax: 254-44-20655
When replying please quote

Machakos Highway
P.O. Box 2574-90100
Machakos

Ref: MOH/MKS/REARCH/VOL.1/52

29th March, 2019

Susan Katunge Kivaya
Kenyatta University
P.O Box 43844-00100
NAIROBI

RE: PERMISSION TO CARRY OUT RESEARCH

I make reference to your request dated 17th January, 2019 on the above subject.

You are hereby permitted to carry out your research on "***Competency of Community Health Volunteers on Complementary Feeding Strategies of Children 6 – 23 Months in Masinga, Machakos County, Kenya***" for the period ending 17th January, 2020.

By a copy of this letter, the Officers concerned are asked to offer the necessary support.

Kindly note, you are supposed to furnish this office with a copy of your study findings at the end your study.

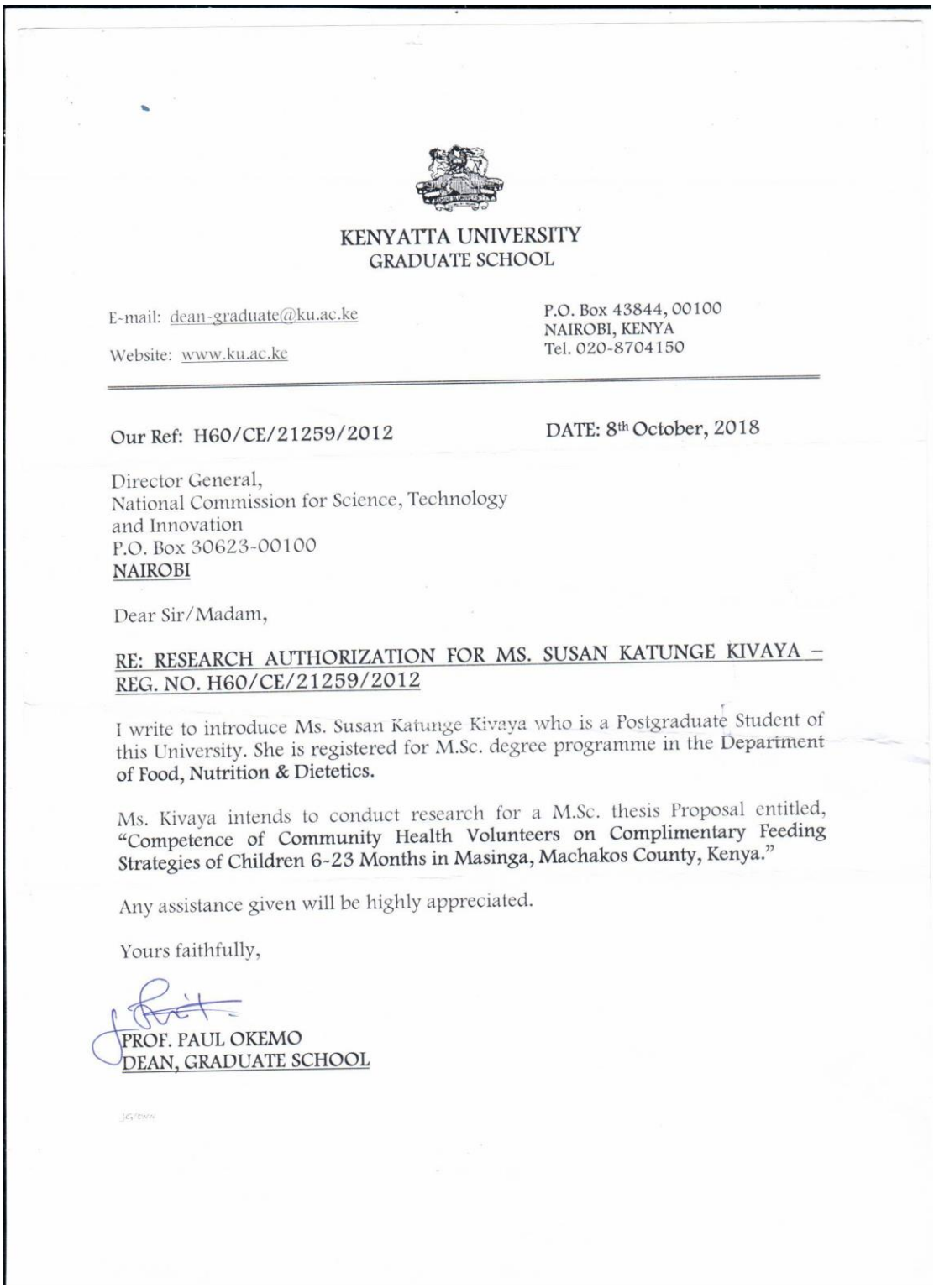
Thank you.

Dr. Ruth Muthama
Director, Preventive and Promotive Services
MACHAKOS

Copy to:
Chief Officer
HEALTH AND COMMUNITY OUTREACH

Chief Officer
MEDICAL SERVICES

APPENDIX: J AUTHORIZATION FROM GRADUATE SCHOOL



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Our Ref: H60/CE/21259/2012

DATE: 8th October, 2018

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MS. SUSAN KATUNGE KIVAYA – REG. NO. H60/CE/21259/2012

I write to introduce Ms. Susan Katunge Kivaya who is a Postgraduate Student of this University. She is registered for M.Sc. degree programme in the Department of Food, Nutrition & Dietetics.

Ms. Kivaya intends to conduct research for a M.Sc. thesis Proposal entitled, "Competence of Community Health Volunteers on Complimentary Feeding Strategies of Children 6-23 Months in Masinga, Machakos County, Kenya."

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. PAUL OKEMO
DEAN, GRADUATE SCHOOL

APPENDIX K: ETHICAL CLEARANCE

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
Website: www.ku.ac.ke

P. O. Box 43844,
Nairobi, 00100
Tel: 8710901/12

Our Ref: KU/ERC/ APPROVAL/VOL.1 (237) Date: 21st November, 2018

Susan Katunge Kivaya
P.O Box 43844-00100
NAIROBI

Dear Susan ,

APPLICATION NUMBER: PKU/935/1992 "COMPETENCY OF COMMUNITY HEALTH VOLUNTEERS ON COMPLIMENTARY FEEDING STRATEGIES OF CHILDREN 6-23 MONTHS IN MASINGA, MACHAKOS COUNTY, KENYA

1. **IDENTIFICATION OF PROTOCOL**

The application before the committee is with a research topic "**Competency Of Community Health Volunteers On complimentary Feeding Strategies Of Children 6-23 Months In Masinga, Machakos County**," received on 31st October, 2018 and discussed on 20th November, 2018

2. **APPLICANT**

Susan Katunge Kivaya

3. **SITE**

Masinga, Machakos County

4. **DECISION**

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines and **APPROVED that the research may proceed for a period of ONE year from 20th November , 2018.**

5. **ADVICE/CONDITIONS**

i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
ii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.
iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.
If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

KENYATTA UNIVERSITY OFFICE OF THE CHAIRMAN 04 DEC 2018 ETHICS REVIEW COMMITTEE P.O. BOX 43844 - 00100 NAIROBI

PROF. JUDITH KIMIYWE
CHAIRMAN ETHICS REVIEW COMMITTEE

I SUSAN K. KIVAYA .....accept the advice given and will fulfill the conditions therein.

Signature..... Dated this day of 4th of December ..... 2018.

cc.
DVC-Research Innovation and Outreach