

The Impact of Community Health Volunteers' Service Delivery on Nutrition Outcomes of Households with Children 6-59 Months in Alego Usonga, Siaya County, Kenya

Amos Odiwuor¹
Asenath Sigot²
Lucy Mutuli³

¹ongiroamos@gmail.com (+254 721 339 068)

²asigot@mmust.ac.ke (+254 722 612 160)

³lmutuli@mmust.ac.ke (+254 721 441 183)

¹<https://orcid.org/0009-0003-7324-8314>

²<https://orcid.org/0000-0003-2478-3751>

³<https://orcid.org/0009-0005-8430-8591>

^{1,2,3}Masinde Muliro University of Science and Technology, Kenya

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ABSTRACT

Community Health Volunteers (CHVs) are used in nutrition service delivery and realizing Universal Health Coverage. Nevertheless, poor nutrition outcomes still exist in households under the care of CHVs, resulting in high rates of malnutrition and deaths. Guided by the Health Belief Model (HBM) the researcher established the relationship between the service delivery of CHVs and the nutrition outcomes of households with children aged 6-59 months in Alego Usonga Sub-County, Siaya County, Kenya. A cross-sectional study design was used. The sample size was determined using Krejcie and Morgan's formula to arrive at 353 participants. The researcher then used purposive, multi-stage, and systematic sampling strategies to reach the participants. Data was collected using structured questionnaires. The target population was households with children 6-59 months in Alego Usonga, Siaya County. SPSS software was used to analyze data, after that, the relationships were tested using Fisher's Exact Test. Results: significant association between frequency of household visitation by CHVs and MDD, growth monitoring and promotion clinic attendance, deworming in the past six months, and availability of kitchen gardens in the households (p-values<0.05, FET); significant association between referral for immunization and FIC at 11 months (p-value 0.022, FET), referral for growth monitoring and promotion, and the number of children attending growth monitoring and promotion clinics (p-value 0.002, FET); significant association between counseling on complementary feeding and other foods consumed by children 6-23 months other than breast milk (p-value 0.047, FET), counseling on complementary feeding and MDD and MMF (p-values 0.014 & 0.003, respectively, FET), counseling on growth monitoring and promotion and attendance of growth monitoring and promotion clinics (p-value 0.001, FET), and counseling on the importance of kitchen garden and availability of kitchen gardens in the households (p-value 0.000, FET). Therefore, a significant relationship exists between household visitations, referrals, follow-ups, and counseling services conducted by CHVs, and the nutrition outcomes of households with children aged 6-59 months. Following these findings, the researcher recommends that the government continue supporting the CHVs by providing timely motivation and adequate resources. However, other experimental study designs with stronger statistical significance should be deployed to directly evaluate the CHVs' service delivery and nutrition outcomes at the household level.

Keywords: Children 6-59 Months, Community Health Volunteers, Nutrition Outcomes, Service Delivery, Siaya

I. INTRODUCTION

Malnutrition manifests in three folds: undernutrition, over-nutrition, and micronutrient deficiency. However, undernutrition is the most visible and widespread form of malnutrition- as it is associated with low economic status and adverse human suffering. Micronutrient deficiency is a global public health problem as it poses a significant threat to the health and development of populations worldwide, particularly among children and pregnant women in low-income countries (Ohanube et al., 2022). World Health Organization (WHO) advocates universal access to adequate nutrition intervention and healthy diets from sustainable and resilient food systems. This is well stipulated in the UN 2016-2025 Nutrition Strategy, dubbed the United Nations Decade of Action on Nutrition (Freire, 2017).

Across the globe, 149 million children below the age of five years were estimated to be stunted in 2022, 45 million were estimated to be wasted, 37 million were overweight or obese, and 400 million were found to be suffering from micronutrient deficiency. Approximately half of deaths among under-five children were linked to undernutrition; a majority of them occur in low and middle-income countries (WHO, 2024).

According to Wudil et al. (2022), 346 million Africans are undernourished. Africa also accounted for 24% of all overweight children in 2014 (Bongaarts, 2021). Sub-Saharan Africa (SSA) presents the highest number of undernutrition cases in Africa, attributed to the ever-rising levels of hunger since 2014. The Eastern and Middle sub-regions account for 27% and 29% of undernutrition, respectively, as of 2019 (Onyango et al., 2019). SSA is predicted to show the slowest improvement in food security as the food-insecure population is expected to drop from 40.5% to 24.4%. Anemia is the most common form of the household burden of malnutrition, affecting about seven out of ten households in SSA. Double and triple-burden forms of malnutrition are also found in SSA in 8% and 5% of households, respectively (Christian & Dake, 2021). From these statistics, SSA is unlikely to achieve the sustainable development goals (SDGs) of ending hunger and all forms of malnutrition by 2030 (Sathyamala, 2017).

In Kenya, 17.6% of children under the age of five years are stunted, 4.9% are wasted, and 10.1% are underweight (Kenya National Bureau of Statistics [KNBS], 2023). These high rates of malnutrition could be attributed to the declining status of food security in the county, where 10 million people are reported to be facing chronic food insecurity and severe hunger, and between two to four out of ten people requiring food assistance at any given time (Rono et al., 2023; Government of Kenya, 2011).

Concerning infant and young child feeding (IYCF) practices, only 59.7% of children less than six months are exclusively breastfed; 60.1% of newborns are initiated on breast milk within one hour of birth; 83% of children are exclusively breastfed for the first two days after birth; 98% of children less than two years are reported as ever breastfed; 87% of children 6-8 months are introduced to solid, semi-solid, and soft foods; 36.9% of children 6-23 months achieve minimum dietary diversity (MDD); 71% of children 6-23 months receive recommended minimum meal frequency (MMF), 30.8 of children 6-23 months receive minimum acceptable diet (MAD); a whopping 33.6% of children 0-23 months are fed from a bottle with a nipple; 65% of children 12-23 months are continuing with breastfeeding; while the proportion of children aged 6-59 months with diarrhea treated with ORS and zinc stands at 31.6%. Vitamin A supplementation among children aged 6-59 months stands at 64%, while two-thirds of children 12-59 months have been dewormed in the last six months. On water sanitation and hygiene (WASH) indicators, 62.9% of Kenyan households do not treat their drinking water, only 51.3% have functional handwashing facilities, and 7.2% defecate in open places. This implies that many families are still exposed to waterborne diseases (KNBS, 2023).

In Siaya County, stunting, wasting, and underweight rates remain high at 19.2%, 1.7%, and 7%, respectively, though marking a significant improvement from 24.7%, 4%, and 11 % in 2014 (KNBS, 2023). The county poverty index stands at 47.5%, the literacy level at 80%, and only 42% of the population can access clean and safe water (County Government of Siaya, 2024). Exclusive breastfeeding among children under six months is 65.5%, while Vitamin A supplementation + Deworming (VAS+D) stands at 81.6% (Kenya Health Information System [KHIS] Aggregate, 2022). KNBS (2023) also reports poor Water Sanitation and Hygiene (WASH) indicators, with 36.3% of the households not treating drinking water, 6.2% of the population defecating in open places, and only 20.7% owning functional handwashing facilities. Moreover, there is limited information on complementary feeding and household food security status.

Engaging CHVs in nutrition and health service delivery has become a norm globally, not just in Siaya County alone. With the shortage of health care workers (HCWs) across all cadres and the high HCWs-to-patient ratio, WHO recommends task shifting in various levels of health service delivery. CHVs have, therefore, been recognized in health service delivery as they are cost-effective and impactful (Cometto et al., 2018).

Kenya's second National Health Sector Strategic Plan (NHSSP II – 2005-2011) introduced the Kenya Essential Package of Health (KEPH) with the innovation of recognizing and introducing health services at level 1 (community unit). In this new model, CHVs were introduced as the first interface in health service delivery, of which nutrition is part and parcel. Since then, CHVs have been capacity-built on various health modules to help them perform health functions in the community. In nutrition, CHVs had been trained in nutrition assessment, growth monitoring and promotion, counseling on good nutrition, and referral of malnutrition cases. Therefore, CHVs are expected to help improve the nutrition outcomes of the households they serve, especially those with children below five years.

1.1 Statement of the Problem

Poor nutrition is a significant cause of ill health, with close to half of deaths in children under five years being attributed to malnutrition. In SSA, children are more than 14 times more likely to die before celebrating their fifth birthday than in developed regions (WHO, 2024). A large proportion of under-five deaths in SSA and other developing regions have been attributed to undernutrition and poor household environmental conditions (Amegah, 2020). In Kenya, one in every thirty-one children dies before the first birthday, while one in every twenty-four dies before celebrating the fifth birthday (KNBS, 2023). The situation is similarly worse in Siaya County, as one in every nine children is lost before the first birthday, while one in every six children also dies before the fifth birthday (KNBS, 2013). Despite robust CHV programming in the County, there has never been a structured evaluation of CHVs'

performance in terms of service delivery and their subsequent effect on nutrition outcomes in households with children aged 6-59 months. A study on the causes of death in HIV-infected and HIV-uninfected under-five-year-old children in Western Kenya by Child Health and Mortality Prevention Surveillance (CHAMPS), revealed that malnutrition accounted for 23% of the deaths as an underlying cause, second highest after HIV disease (Onyango et al, 2021). Further, routine data captured in the KHIS also show that Alego Usonga presents with the poorest nutrition and WASH indicators among the six sub-counties of Siaya County. Moreover, Kenya Community Health Strategy 2020-2025 captures the following as some of the challenges befalling community health services: weak supervision of CHVs, weak referral systems between communities and facilities, inadequate knowledge and understanding of the role of the community health workforce in the referral system, incomplete implementation of the full range of community health services offered by the community health workforce, and limited monitoring of the quality of community health services.

1.2 Research Objective

To establish the relationship between Community Health Volunteers' service delivery and the nutrition outcomes of households with children aged 6-59 months in Alego Usonga, Siaya County.

II. LITERATURE REVIEW

2.1 Theoretical Review

The study was backed by the Health Belief Model (HBM), which posits that health messages will achieve optimal behavior change if they successfully target perceived barriers, benefits, self-efficacy, and threats. The Health Belief Model has six core constructs: perceived severity, perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, and cues to action. The model can be applied to public health messaging to increase the effectiveness of public health messaging in motivating members of households to adopt healthy practices and behavior. It was developed to help understand why people did or did not use preventive services offered by public health departments in the 1950s. It theorizes that people's beliefs about whether or not they are at risk for a disease or health problem, and their perception of the benefits of taking action to avoid it, influence their readiness to take action (Jones et al., 2014).

CHVs can use this model to teach the households under their jurisdiction, the perceived risks and benefits they are exposed to, if they adopt or fail to adopt certain practices and behaviors, in their pursuit to scale up preventive and promotive health services. CHVs can also help break the perceived barriers and threats that inhibit household members' cues to adopt healthy practices. For instance, household visitation, counseling, referral, and follow-ups by CHVs, would act as events that trigger household members to change their behavior and adopt healthy practices (Ngigi & Busolo, 2018). Therefore, this model can improve nutrition outcomes, especially in households served by CHVs, ensuring that they inform household members about the benefits and risks of adopting certain practices and behaviors. Consequently, the household members, having been appraised of the perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and cues to action, will likely develop self-efficacy and adopt recommended nutrition practices and behavior.

2.2 Empirical Review

A CHV is a person selected by the community based on some set criteria and has undertaken relevant basic training as per the curriculum to offer health services at the community level (The Nairobi City County Community Health Services Act, 2019). According to Kok et al. (2016), CHVs' programs emanated from the Alma-Ata Declaration of 1978 in Alma-Ata, Kazakhstan, when the WHO and UNICEF organized the first international conference on primary healthcare. The Declaration called for the achievement of Health for All by the year 2000 through primary healthcare, with the following Principles: social justice, equity, community participation, disease prevention, multi-sectoral collaboration, decentralization of services, use of appropriate technology, and service provision by a team of workers, including community-based workers. Further, introducing the Community Health Strategy (CHS) in Kenya in 2006 established the vibrant role of CHVs in implementing community health services. Today, Kenya has 88403 CHVs under the supervision of 3250 Community Health Assistants, serving several Community Units whose functionality ranges from as low as 10 to 90 across the Country (MOH, 2020).

Kok et al. (2016) also state that CHVs' performance can be measured at two levels. First, at the individual CHV level, assess their cognitive, affective, and behavioral changes, adherence to guidelines, job satisfaction, and capacity to facilitate community agency. Second, at the community level, CHV-attributable outcomes in community behaviors regarding increased consumption of health services in the community and adoption of healthy practices should be measured. In this study, the researcher assessed the performance of CHVs based on their service delivery outputs at the household level in terms of household visitation, counseling services, referrals, and follow-ups.

According to Cometto et al. (2018), the WHO recommends that CHVs perform promotive and preventive services; identify family health and social needs and risks; trace and refer patients; engage in community disease surveillance, monitoring, data collection, analysis, and use; provide psychosocial support; maintain the confidentiality of the clients; and facilitate effective communication, community engagement, mobilization and maintenance of personal safety. Woldie et al. (2018) also support the use of CHVs in the delivery of certain preventive, promotive, and curative services but report a gap in the use of CHVs to manage more complex activities. Therefore, they recommend more studies examining CHVs and their capabilities to support policymakers' decision-making. Nikhil and Roopashree (2022) found that nutrition can effectively be promoted through institution building at the community level. Also, interventions around social behavior change communication have demonstrated promises for triggering and sustaining improvements in nutrition outcomes.

2.3 Conceptual Framework

The conceptual framework in Figure 1 underscores the pivotal role of CHVs in influencing nutrition outcomes. It aims to establish a clear link between CHVs' service delivery performance and nutrition outcomes in households with children aged 6-59 months.

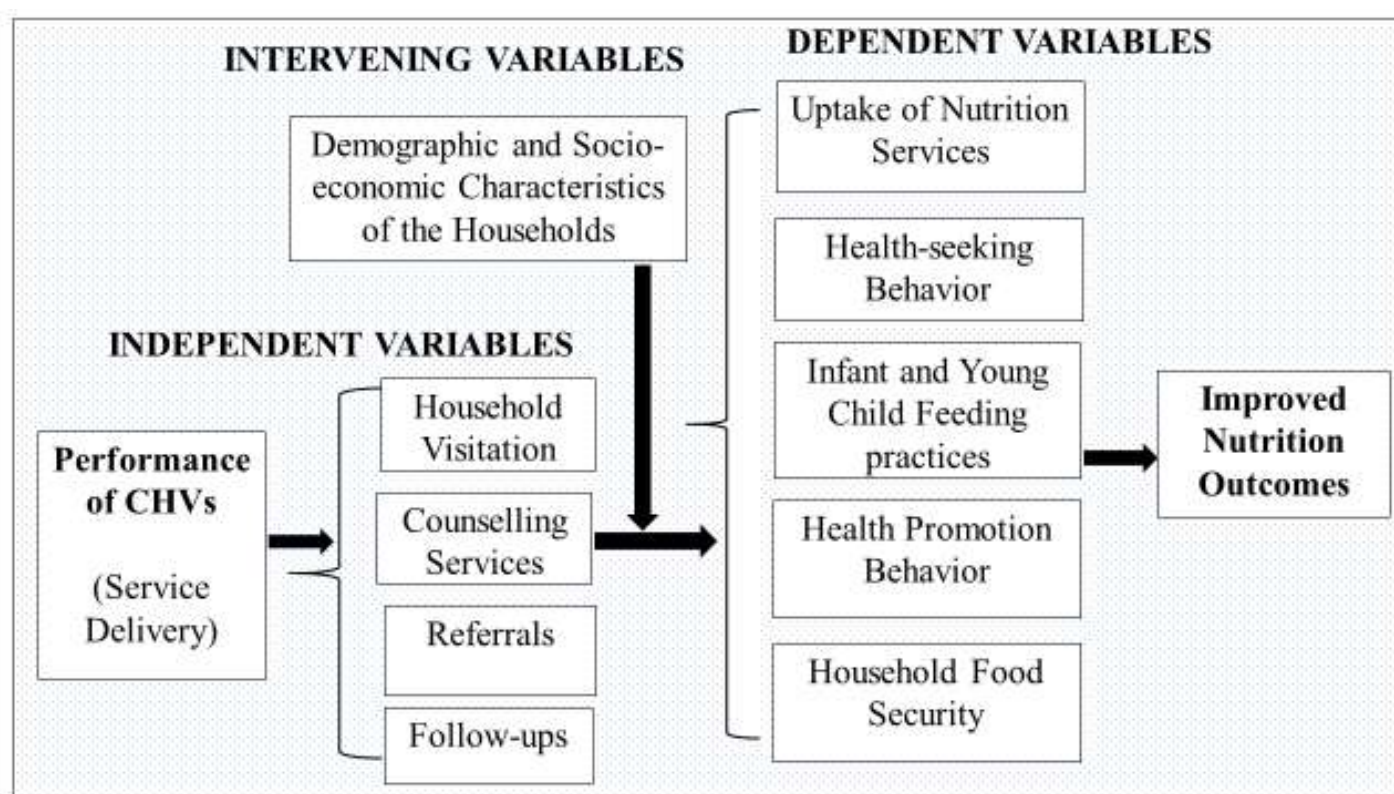


Figure 1
Conceptual Framework

2.3.1 Nutrition Outcomes

The researcher assessed the uptake of nutrition services, health-seeking behavior, health promotion behavior, infant and young child feeding practices, and household food security. Some of these nutrition outcomes were derived from the Community Health Information System (CHIS) as reported by CHVs in their Service Delivery Logbook (MOH 514) monthly. They included children 12-59 months dewormed, children 6-59 months participating in growth monitoring and promotion, children aged 6-59 months with diarrhea treated with ORS + zinc sulfate, children 6-59 months supplemented with vitamin A in the last six months, ever breastfed children, early initiation of breastfeeding, exclusively breastfed for the first two days after birth, Exclusive breastfeeding under six months (EBF), bottle feeding 0-23 months, Minimum Dietary Diversity 6-23 Months (MDD), Minimum Meal Frequency 6-23 Months (MMF), Minimum Acceptable Diet 6-23 Months (MAD), household food security. The other outcomes include households with functional pit latrines, hand washing facilities, treated water for drinking, availability of a kitchen garden, immunization uptake, and skilled deliveries in the households.

2.3.2 Service Delivery of CHVs

The researcher conducted a comprehensive assessment of the performance of CHVs in terms of their service delivery at the household level. This assessment was based on data derived from the CHIS, which was captured in various data sets and reported monthly by the CHVs. The variables assessed included household visitation, counseling, referrals, and follow-ups conducted by the CHVs. The researcher evaluated the frequency of household visitation, the number of households visited by the CHVs every month, newborns visited within 48 hours of birth, children 6-59 months referred for immunization services, children 6-59 months referred for vitamin A supplementation, children 12-59 months referred for deworming, children 6-59 months referred to the health facility within 24 hours of the onset of illness (fever and diarrhea), children 6-59 months with moderate and severe malnutrition referred to the health facility for management, and children counseled on IYCF and other nutrition-related indicators. This detailed assessment provided a comprehensive understanding of the CHVs' performance, which is crucial for our research findings.

III. METHODOLOGY

3.1 Study Area and Population

The study was conducted in Alego Usonga, Siaya County, an administrative unit located in the Lake Victoria Basin, in Western Kenya. The County had a population of 993,183 people confined in an area of 2529.8 km² (KNBS, 2019). It is among the few counties in Kenya with 100% Community Unit (CU) coverage. Their CHVs have been on a monthly stipend for the work done for the longest duration since the advent of the CHS in Kenya. The study subjects were households with children aged 6-59 months served by CHVs.

3.2 Study Design

The study was conducted between February and May 2024. The researcher used a cross-sectional design following a concurrent triangulation strategy to explain concepts, characteristics, descriptions, and measures to express variables under investigation. The study design was meticulously crafted, instilling confidence in the reliability and applicability of the findings in any setup. The sample size was scientifically calculated, ensuring it was representative. To ensure internal reliability, data collection tools and methods were standardized by ensuring the interview questions were logically arranged, administered in a similar sequence, and responses uniformly captured. Service delivery was assessed establishing visitations, referrals, follow-ups, and counseling services offered by CHVs at the household level; whereas, nutrition outcomes were appraised by looking at the first seven infant and young child feeding (IYCF) practices in order of their priority and precision as listed by WHO, calculating household food security using the Household Food Insecurity Access Scale, and evaluating the uptake of nutrition services, health-seeking behavior, and health promotion at the households.

3.3 Sample Size Determination

Since the study was conducted on a finite population, Krejcie and Morgan's (1970) formula was used to arrive at a sample size of 353 households considering a 10 percent design defect.

3.4 Sampling Techniques

Siaya County was purposively sampled because it presented high child mortality and stunting rates. In Western Kenya, it tied with Bungoma as counties with the highest stunting rates of 19% each (KNBS, 2023). Subsequently, Alego Usonga was purposively sampled because of poor community health and nutrition indicators. For instance, the Sub-County was cited as having the lowest percentage of households with handwashing facilities at 30.2% and using treated water at 40.5%, against the County averages of 52.9% and 66.4%, respectively. The Sub-County also presented the highest rates of underweight children and treated diarrhea cases among under-five-year-old children at 10.8% and 18.2%, respectively, compared to the County rates of 6.8% and 4.9% (KHIS, 2022).

The researcher then used a multi-stage sampling method based on the population proportions of each unit to randomly identify 3 wards, 11 community units, and 38 villages. Subsequently, the households were systematically identified from the lists of households with children aged 6-59 months provided by CHVs of the respective villages of the study, and proportionately randomly sampled.

3.5 Data Collection Tools and Procedure

Using a structured questionnaire, the researcher engaged four research assistants who collected data from 361 households. CHVs assisted the research assistants in identifying the households for interviews. After data collection, data cleaning was done and 356 households were retained having expunged 5 households with incomplete and inconsistent data.

3.6 Quality Assurance

The research assistants underwent rigorous training on the data collection tools and procedures. This training, which included sampling study respondents, inclusion and exclusion criteria, interview administration, and adherence to ethical principles, ensured the quality of data collection and analysis. The researcher provided close supervision and support to the research assistants daily, enhancing the quality assurance process.

3.7 Data Analysis

The data was imported into the Statistical Package for Social Sciences (SPSS) software for cleaning, verification, and analysis. Fisher's Exact Test was used to establish the association between the study variables. Consequently, P-values ≤ 0.05 were considered statistically significant at a 95% confidence level.

3.8 Ethical and Logistical Considerations

The research was approved by Masinde Muliro University of Science and Technology - Directorate of Post Graduate Studies (DPS) and, subsequently cleared by Masinde Muliro University of Science and Technology Ethics Review Committee, approval no. MMUST/IERC/002/2024. The National Commission of Science, Technology, and Innovation (NACOSTI), issued research permit no. NACOSTI/P/24/32711. Lastly, the researcher sought permission from the County Health Management Team (CHMT) of Siaya County before moving to the field to collect data.

IV. FINDINGS & DISCUSSION

The results of the study are reported in Table 1.

4.1 Relationship between Household Visitation and Nutrition Outcomes

Significant relationships were established between the frequency of household visitation by CHVs and MDD, growth monitoring and promotion clinic attendance, deworming in the past six months, and availability of kitchen gardens in the households (p-values < 0.05 , FET). There was also a strong relationship between visitation within 48 hours of birth and initiation of breastfeeding (p-value 0.000, FET). Households that were frequently visited had a high uptake of MDD, growth monitoring and promotion, deworming, kitchen gardens in the households, and initiation of breastfeeding after birth. For instance, households visited weekly had a high uptake compared to those visited monthly and rarely in that order. Likewise, households visited monthly had a greater impact as opposed to the ones rarely visited by the CHVs. However, no significant relationships were established between the frequency of household visitation and MMF, MAD, FIC at 11 months, vitamin A supplementation in the last six months, treating drinking water, availability of functional latrines and handwashing facilities in the household (p-values > 0.05 , FET).

4.2 Relationship between Referral Services and Nutrition Outcomes

Significant relationships were established between referral for immunization and FIC at 11 months (p-value 0.022, FET), referral for growth monitoring and promotion, and the number of children attending growth monitoring and promotion clinics (p-value 0.002, FET). Among children that were referred for immunization 93.1%% got fully immunized at 11 months, while among those that were not referred for immunization, only 77.7% got fully immunized. About 83.8% of the children referred for growth monitoring and promotion attended growth monitoring and promotion clinics compared to 83.1% who were never referred. However, there were no significant relationships between referral for vitamin A supplementation and deworming and the number of children that were supplemented with vitamin A and dewormed in the last six months preceding the interview period (p-values 0.688 & 0.794, respectively, FET).

4.3 Relationship between Counselling Services and Nutrition Outcomes

Significant relationships were noted between counseling on complementary feeding and other foods consumed by children 6-23 months other than breast milk (p-value 0.047, FET), counseling on complementary feeding and MDD and MMF (p-values 0.014 & 0.003, respectively, FET), counseling on growth monitoring and promotion and attendance of growth monitoring and promotion clinics (p-value 0.001, FET), and counseling on the importance of kitchen garden and availability of kitchen gardens in the households (p-value 0.000, FET). About 61% of the children aged 6-23 months whose caregivers were counseled on complementary feeding by CHVs consumed foods other than breast milk, and 37.9% whose caregivers were not counseled on complementary feeding consumed foods other than breast milk. Approximately 2.5% of children aged 6-23 months counseled on complementary feeding achieved MDD compared to 1.6% who achieved MDD but were never counseled. About 46.3% of children whose caregivers were counseled on complementary feeding achieved MMF, while 28.4% achieved, but their caregivers did

not get counseling. Among the caregivers who were counseled on growth monitoring and promotion, 93.3% of their children attended growth monitoring and promotion sessions, whereas 79% attended growth monitoring sessions, but the caregivers did not get counseled. Approximately 78% of the households educated on the importance of kitchen gardens by the CHVs had kitchen gardens, while 41% had kitchen gardens but were not talked to. However, no significant relationships were established between counseling on breastfeeding and the number of children breastfed the previous day and night (p-value 0.098, FET), counseling on complementary feeding and MAD (p-value 0.062, FET), counseling on micronutrient supplementation and vitamin A supplementation in the last six months (p-value 1.000, FET), counseling on water and water treatment by the households (p-value 0.913, FET), counseling on sanitation and availability of functional pit latrines in the households (p-value 0.72, FET), and counseling on hygiene and availability of functional handwashing facilities in the households (p-value 0.094, FET). Neither was there a significant relationship between the households that benefitted from the education offered by CHVs on the importance of kitchen gardens and the status of household food security (p-value 0.746, FET).

4.4 Relationship between Water, Sanitation, and Hygiene and Diarrhea Cases in Children Aged 6-59 Months

No significant relationship was established between water treatment, availability of functional pit latrines and handwashing facilities, and cases of diarrhea in children 6-59 months in the last two weeks (p-values 0.162, 0.129, and 1.000, respectively, FET).

4.5 Relationship between Household Food Security Status and Complementary Feeding Practices

A significant relationship was established between food security status and MMF (p-value 0.011). However, no significant relationships were established between the food security status and MDD and MAD (p-values 0.360 & 0.447, FET respectively). Among the households categorized as food secure, 31.9% achieved MMF, whereas among those categorized as food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger, 19%, 27.6%, and 32.4% achieved MMF, respectively.

Table 1

Relationship between Service Delivery and Nutrition Outcomes

CHV's Service Delivery	Household Nutrition Outcomes		Fisher's Exact Test	
		df	Value	P-value
Frequency of household visitation	MDD	8	16.428	0.038
	MMF	8	12.291	0.096
	MAD	8	15.288	0.080
	Growth monitoring and promotion of clinic attendance	4	10.494	0.026
	FIC at 11 months	4	4.341	0.391
	Vitamin A supplementation in the last six months	4	5.318	0.504
	Deworming in the last six months	8	18.125	0.029
	Drinking water treatment	4	2.685	0.66
	Availability of functional pit latrine/toilet	4	9.08	0.064
	Availability of functional handwashing facilities	4	3.527	0.489
	Availability of kitchen garden	4	14.152	0.002
Visitation within one hour of birth	Initiation of breastfeeding	12	34.507	0.000
Referral for immunization	FIC at 11 months	2	7.329	0.022
Referral for Vitamin supplementation	Vitamin A supplementation in the last six months	2	0.792	0.688
Referral for deworming	Deworming in the last six months	4	1.703	0.794
Referral for growth monitoring and promotion	Growth monitoring and promotion of clinic attendance	2	9.061 ²	0.002

Table 1 Continued

CHV's Service Delivery	Household Nutrition Outcomes		Fisher's Exact Test	
		df	Value	P-value
Counselling on breastfeeding	Breastfed yesterday during the day and night	4	7.774	0.098
Counseling on complementary feeding	Consumed foods other than breast milk	4	8.853	0.047
	MDD	4	11.704	0.014
	MMF	4	15.895	0.003
	MAD	4	8.068	0.062
Counselling on micronutrient supplementation	Vitamin A supplementation in the last six months	2	0.168	1.000
Counselling on growth monitoring and supplementation	Growth monitoring and promotion of clinic attendance	2	14.124	0.001
Counselling on water	Drinking water treatment	2	0.197	0.913
Counselling on hygiene	Availability of functional handwashing facilities	2	4.721	0.094
Counseling on sanitation	Availability of functional pit latrine/toilet	2	0.714	0.72
Talked about the importance of having a kitchen garden	Availability of kitchen garden	2	52.191	0.000
Drinking water treatment	Children with diarrhea in the last two weeks	1	2.165	0.162
Availability of functional handwashing facilities	Children with diarrhea in the last two weeks	1	2.264	0.129
Availability of functional pit latrine/toilet	Children with diarrhea in the last two weeks	1	0.004	1.000
Food Security Status	MDD	6	6.279	0.360
	MMF	6	16.303	0.011
	MAD	6	5.174	0.477
Talked to about the importance of kitchen garden	Food Security Status	6	4.236	0.746

4.6 Discussion

This study depicts the integral role played by CHVs in health promotion and prevention. According to Wakiaga et al. (2024), CHVs are well-placed to promote health and prevent diseases. They can conduct health education, promote healthy behaviors, and provide messages on disease prevention measures. Thus, their focus on preventive measures leads to a reduction in the burden of preventable diseases. In support of these assertions, the findings of this study provide a clear-cut direction on the role played by CHVs in promoting primary healthcare with a distinct focus on nutrition service delivery. To further solidify these findings, the following are documented as CHVs global practices in different countries across the world: home visits, health education, health promotion, and disease prevention, identification and referral of cases that need more well-equipped care installation, management of pneumonia and diarrhea, behavior change promotion, education on nutrition, safe delivery, family planning, immunization, hygiene, and sanitation, treatment for moderate acute malnutrition, monitoring nutrition state of children, promoting the uptake of nutrition and health services, improving care-seeking behavior, and counseling on child nutrition services (De Deus E Mélo et al., 2023; Shreshtha et al., 2024). Consequently, this study has established significant associations between household visitation, referral, follow-up, and counseling services rendered by CHVs and the nutrition outcomes of households with children aged 6-59 months as discussed in the subsequent paragraphs.

Household visitation by CHVs was significantly related to MDD, growth monitoring and promotion clinic attendance, deworming, availability of kitchen gardens, and initiation of breastfeeding. These findings were consistent with a study conducted in Bangladesh, where, CHVs' visits to caregivers of children aged 0-23 months improved complementary feeding practices, especially when IYCN was integrated into a mainstream nutrition program (Rahman et al., 2023). A study in Kenya also revealed that during home visits, CHVs assess children's growth and overall health, provide health education, and support caregivers in making decisions on the well-being of their children (Githinji & Ngala, 2023). It was also found that CHVs' home visits increased breastfeeding initiation by 1.5 folds and exclusive breastfeeding by 4.42 folds among Mongolian children (Janmohamed et al., 2020a). Moreover, it is recommended that home visits by CHVs should be prioritized when integrating complementary feeding practices into mainstream nutrition programs (Rahman et al., 2023).

Referral services done by CHVs resulted in a high uptake of nutrition and health services in the community. It was evident from the study that more children referred for immunization by CHVs got fully immunized compared to those who were never referred. The study also showed that more children referred for growth monitoring attended

growth monitoring clinics than those never referred. It is considered that CHVs can play a key role in preventing identifying, and managing child undernutrition (Bridge & Lin, 2024). These findings are further supported by two other studies that established that CHVs are effective in active case finding, early identification, and referral of cases for nutrition management (Lopez-Ejeda et al, 2018; Mohammed & Mosmar, 2018).

Counseling services conducted by the CHVs at the households also showed significant relationships with various nutrition outcomes. These findings agreed with those of a study conducted in Low and Middle-Income Countries, where nutrition counseling improved breastfeeding initiation after birth, maternal behavior, and health outcomes. The study, however, noted uncertainty about the effects of nutrition counseling due to low certainty of evidence and a low number of studies for some key outcomes (Dewidar et al., 2023).

This study established no significant relationship between WASH indicators and diarrhea cases. However, several studies have established significant associations between WASH parameters and the prevalence of diarrhea. WASH practices were independent predictors of diarrhea among children under 3 years old in India (Roy et al., 2023). In Low & Middle-Income Countries, various WASH interventions have proven effective in reducing the prevalence of diarrhea cases in children (Darvesh et al., 2023; Giri et al., 2022; Merid et al, 2023; Wolf et al., 2022). In Sub-Saharan Africa, it was also established that the source of drinking water and toilet facilities had a significant effect on childhood diarrhea (Amadu et al., 2023). Likewise, a strong relationship was established between handwashing behavior and cases of diarrhea in school-age children (Nuraeni et al., 2022).

Food security status was also found to be significantly related to MMF. These findings were consistent with several studies conducted in different settings across the globe: in rural Zambia, it was established that food-secure households based on dietary diversity score were significantly more likely to achieve MMF; in Ethiopia, a significant association between food security and MMF was established; the same applied to North Uganda, where household food security was considered a strong determinant of child dietary diversity with influence on feeding practices. However, no association was found between food insecurity and complementary feeding practices (MDD, MMF, and MAD) in Low and Middle-Income Counties. Also, in Urban Informal Settlements of Nairobi, it was found that except MMF, food-secure households were significantly more likely to achieve appropriate IYCF practices than those in food-insecure households (Agbadi et al., 2017; Ahmed et al., 2022; Bwalya et al., 2023; Erelu et al., 2023; Janmohamed et al., 2020b; Macharia et al., 2018).

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

Community Health Volunteers play a significant role in nutrition service delivery at the household level with their unwavering dedication and selfless service. They tirelessly contribute to household visitations, intensive case finding, referral of needy cases, follow-up on referral cases, and counseling services. CHVs also play essential roles in ensuring community access and uptake of nutrition services. Consequently, there is a significant relationship between household visitations, referrals, follow-ups, and counseling services conducted by CHVs, and the nutrition outcomes of households with children aged 6-59 months. Therefore, optimal service delivery by CHVs positively impacts the nutrition outcomes of households with children aged 6-59 months.

5.2 Recommendations

Based on the findings above, the researcher recommends upscaling and strengthening nutrition service delivery by CHVs in households. In line with the above recommendation, the government should provide timely motivation and adequate resources to support CHVs' work. Moreover, there should be continued involvement and partnership among stakeholders to build the capacity of CHVs in nutrition service delivery further. However, the study did not directly link the CHVs with the nutrition outcomes in the households as the researcher deployed a non-experimental cross-sectional study design. The researcher, therefore, recommends more experimental study designs with stronger statistical values to test the relationship between the service delivery of CHVs and the nutrition outcomes of the households.

5.3 Limitations of the study

The study was limited to Alego Usonga Sub-County, Siaya County, Kenya, and was conducted between February and May 2024. During this period, the Country faced economic instability and high inflation rates that could have negatively impacted the nutrition outcomes under investigation. Therefore, if the study were to be conducted at a different time, the nutrition outcomes would be different.

Abbreviations

CHAMPS – Child Health and Mortality Prevention Surveillance
 CHS – Community Health Strategy
 CHV – Community Health Volunteer
 CU – Community Unit
 FET – Fisher’s Exact Text
 FIC – Fully Immunized Child
 HIV – Human Immunodeficiency Virus
 IYCF – Infant and Young Child Feeding
 KNBS – Kenya National Bureau of Statistics
 KPHC – Kenya Population and Housing Census
 MAD – Minimum Acceptable Diet
 MDD – Minimum Dietary Diversity
 MMF – Minimum Meal Frequency
 WASH – Water, Sanitation and Hygiene
 WHO – World Health Organization

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