2021

Mechanisms for CHV Retention Project

Mechanisms for community health volunteer retention in Tana River County, Kenya

Research study end line Report

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PHILIPS R&D AFRICA.

THIS STUDY IS PART OF THE PHILIPS FOUNDATION PROJECT "MECHANISMS FOR COMMUNITY HEALTH VOLUNTEER RETENTION", IN PARTNERSHIP WTH THE INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCITIES (IFRC), FINNISH RED CROSS AND KENYA RED CROSS SOCIETY.

Table of Contents

LIST OF TABLES AND FIGURES:

ABBREVIATIONS

CHA	Community Health Assistant
ChARM	Child Automated Respiratory Monitor
CHS	Community Health Strategy
CLC	Community Life Centre
CU	Community Unit
CHA	Community Health Assistant
CHMT	county health management teams
CHV	Community Health Volunteer
CHW	Community Health Worker
CHEWS	Community Health Extension Worker
ESRC	Ethics and Scientific Review Committee
FGD	Focus Group Discussion
FRC	Finish Red Cross
ICBE	Internal Committee for Biomedical Ethics
ICC	Intra Cluster Correlation Coefficient
iCCM	Integrated Community Case Management
IDI	In depth Interview
IGA	Income Generating Activity
IFRC	International Federation of the Red Cross/ Red Crescent
ICRBP	Integrated Community Resilience Building Project
KII	Key Informant Interview
KRCS	Kenya Red Cross Society
MCH	Maternal and Child Health
MNCH	Maternal and Neonatal Health
MOH	Ministry of Health
MDG	Millennial Development Goal
MUAC	Mid Upper Arm Circumference
NGO	Non-Governmental Organization
PHC	Primary Health Care
RCRC	Red Cross/ Red Crescent
SCHMT	Sub County Health Management Team
SDG	Sustainable Development Goal
UHC	Universal Health Coverage
WHO	World Health Organization

EXECUTIVE SUMMARY

Title: Mechanisms for health volunteer retention in Tana River county, Kenya

Background: Task shifting is a proven approach in which people with basic qualifications or limited health background like the community health volunteers are trained and equipped to undertake selected tasks of trained health workers. This approach helps to off load the already overloaded health workers and enable achievement of critical health indicators. The high attrition of volunteers after training limits the sustainability of volunteer-based community level interventions. There is a need to study the drivers of motivation and strategies in volunteer retention to ensure sustainability of health intervention programs. For this reason, Philips Foundation has supported a project of the International Federation of Red Cross and Red Crescent Societies (IFRC) to study several motivation drivers and establish their impact on retention. As part of the support to IFRC, Philips Foundation commissioned Philips Research to execute the operational research. This report is the end line evaluation of this research.

Objectives: The main objective was to explore the factors that influence the attrition of community. volunteers and the role of Philips CHV outreach kit and mentoring as drivers of CHV retention in Tana River county.

Methods: **Study design**: The study adopted a pre and post quasi-experimental design with a comparator group utilizing both quantitative and qualitative data collection methods to explore the reasons for CHV motivation, attrition and test the effectiveness of using two interventions as motivators. The study was conducted over a period of 11 months (Dec 2019 – October 2020) among 63 CHVs, 4 community health assistants and primary health care workers involved in the ICRBP iCCM project implemented in Tana River county by KRCS through funding support from FRC.

Findings: Both financial and non-financial incentives are important in the motivation and retention of CHVs. We demonstrate that providing simple tools and equipment such as an outreach kit as a one-off incentive can have a lasting effect on motivation by increasing confidence in their abilities to implement iCCM. Additionally, providing alternative skills that can be applied to generate income reduced the need for CHVs to drop off the system to find ways of generating income.

Chapter 1 INTRODUCTION:

Background:

Universal access to health care commonly referred to as Universal Health Coverage (UHC) requires service availability and accessibility to those most in need. In 2006, the World Health Organization (WHO) recommended a threshold for health worker staffing of 2.3 health workers per 1000 population (1). A more recent study estimated an average health worker density of 4.5 health workers per 1000 population to achieve universal health coverage (2) which is part of the Sustainable Development Goals (SDGs) . Kenya lies below all these thresholds at an average of 1.5 health workers per 1000 population (3). Other barriers to health include long distance to health facilities, limited healthcare giver knowledge and socio-cultural isolation. In a bid to curb this urgent need to address health worker shortages and increase access to health interventions, more Ministries of Health in developing countries have looked into task shifting to fill the gap. Task shifting is a process of delegation whereby tasks are moved, where appropriate, to less specialized health workers, a concept that has been given particular prominence and urgency in the face of the demands placed on health systems.

Over the years, many gains have been made with the incorporation of Community Health Volunteers (CHVs) formerly known as Community Health Workers (CHWs) into the health system. Community health volunteers perform a crucial role in broadening access to and coverage of health services in remote areas and undertake actions that lead to improved health indicators in an array of fields of health from child health, maternal health and even assisting in managing endemic and epidemic infectious diseases such as malaria (4). One such program that has succeeded on the back of community health volunteers is the Integrated Community Case Management (iCCM) program aimed at reducing child mortality. However, some community health volunteer programs face challenges, such as low attraction and motivation for new volunteers, poor training, inadequate supervision, lack of supplies and poor relationships with communities. One key frustrating element of many such programs is the high attrition rates of CHVs (5). Gaining a deeper understanding of the main reasons for attraction, motivation and retention of community health volunteers in active community health programs and exploring the effectiveness of proposed motivators of community health volunteers is key.

Problem statement:

Philips Foundation and IFRC through national societies have a mutual interest in improving access to health care in the under-served populations and in preventing ill health through healthy life-style promotion and early detection and treatment of targeted common diseases.

Task shifting is a proven approach in which people with basic qualifications or limited health background such as the community health volunteers are trained and equipped to undertake selected tasks of trained health workers. This approach comes in handy to off load the already overloaded health workers and enable achievement of critical indicators, especially child mortality, where iCCM plays a pivotal role.

The high attrition of volunteers after training limits the sustainability of volunteer-based community level interventions.

Justification:

In order to maintain the critical gains in healthcare achieved through health interventions delivered by community health volunteers, more information on the motivators and factors affecting attrition is required. This information will enable development of more sustainable methods of motivating and retaining community health volunteers. We hypothesized that providing CHVs with the right tools to perform their roles and imparting them with skills to enable them to establish a stable livelihoods base will prevent attrition and motivate them to remain in the system and keep performing their duties as community health volunteers. Through this study, we aimed to identify the main motivators and explored the use of two interventions in achieving the objectives.

The project aimed to study the impact of two motivators in the volunteers' work:

i. Philips community health volunteer outreach kit with basic equipment to assist CHVs in their work in addition to existing CHV outreach kit with consumable commodities.

ii. A mentoring and career/livelihoods enhancement package for the volunteers.

Chapter 2 : REVIEW OF LITERATURE:

It is estimated that Africa had a shortage of 4.2 million health workers in 2013 and the shortage is projected to get worse by 2030 (2). Due to absence or poor accessibility to health care facilities, children are especially vulnerable, as most life-threatening conditions need to be treated within a 24-hour window. Despite the progress made in reducing mortality in children less than five years of age, 75% of the deaths are still caused by a handful of conditions, specifically pneumonia, diarrhea, malaria, and new-born conditions such as prematurity, sepsis and intrapartum related complications. Malnutrition is associated with approximately one-third of the deaths (6)

As countries strive to achieve UHC there is need for innovative approaches such as expanding the role of community health volunteers to meet the health worker gaps and ensuring their retention in the tasks shifted to them.

To reduce child mortality due to the main child killers such as pneumonia, malaria and diarrheal diseases, the World Health Organization (WHO) introduced integrated community case management in 2012 (iCCM) (6). ICCM is typically delivered by community health volunteers at the community level and encompasses treatment for (i) childhood pneumonia with antibiotics, (ii) diarrhea with zinc and oral rehydration salts (ORS) and (iii) malaria with artemisinin combination therapy. The joint statement on iCCM also supports the identification (but not treatment) of severe acute malnutrition and home visits for newborns. Recent reviews of literature indicate that iCCM contributes in the decline in mortality among children 2–59 months up to 76% (7).

Several factors within the health care system have been identified to enhance health volunteer retention, including well-articulated roles in the chain of health care, comprehensive basic and refresher training, functioning supply chain management and effective supervision (8).

The Global Review on Volunteering by the International Federation of Red Cross and Red Crescent Societies (IFRC) revealed drivers for motivation being e.g. a sense of achievement, self-esteem, access to personal and professional development opportunities, supportive management and financial and other incentives (9). Early evidence from the field suggests that empowerment of the volunteers through the provision of equipment and other tools that facilitate their operations improve retention. For example, in one of the Philips Community Life Centre (CLCs) in Kenya a community level intervention that involved training and provision of outreach kits to community health volunteers (CHV)

has led to a retention of 96% of the volunteers since 2014 (unpublished data). This high retention rate is as a result of the positive motivation from the provision of Philips outreach kits, it serves as a pathway to bringing to scale the recruitment and retention of community health volunteers in many locations.
Other studies suggest that interventions that include capacity building aspects for health volunteers, e.g. knowledge and skills enhancement, supportive supervision and mentorship lead to improved motivation and retention of community health volunteers (10,11).

Chapter 3 : METHODS:

Research Objectives

The main aim of the study was to explore the factors that influence the attrition and retention of community volunteers and examine the role of Philips CHV outreach kit and mentoring as drivers of CHV retention in Tana River county.

More specifically, the study investigated the reasons for CHV attrition in Tana River County, the motivational factors and CHV retention mechanisms and the effectiveness of using the Philips Outreach Kit and CHV mentoring and career enhancement as drivers for CHV motivation and retention.

Study Design

The study adopted a quasi-experimental design with a comparator group utilizing both quantitative and qualitative data collection methods to explore the reasons for CHV attrition and test the effectiveness of using an outreach kit and mentoring and career enhancement as motivators.

The study was nested within an ongoing iCCM Project in Tana River County. In Tana River County iCCM was introduced in 2016 as part of the Integrated Community Resilience Building Project (ICRBP) funded by Finnish Red Cross and implemented by KRCS through CHVs who are attached to a level 2- 4 health care facility (primary health care). Sixty-three CHVs were trained in diagnosis and treatment of malaria and diarrhoea in the community, referral of malnutrition and pneumonia cases to health facilities and health promotion. The County government was primarily responsible for the supply of essential curative items like medicines and diagnostic consumables, while any monetary incentives, training (with MoH) and supportive supervision is supported by Kenya Red Cross Society (KRCS). CHVs carry an outreach kit with essential medicines and diagnostic equipment such as malaria rapid testing kit.

Apart from iCCM tasks the CHVs were involved in health promotion activities through household visits and participate in community mobilisation for health campaigns and action days. Their activities cover mostly mother and child health issues.

A study done before the start of the iCCM Project, mapped out possible barriers in task shifting in Tana River County. It concluded that the main barriers for successful task shifting are funding, human resources and sustainable supply chain. The volunteers need sufficient training and continuous supervision and

monitoring as well as recognition to stay motivated (12).

Prior to commencement of the project, national engagement meetings were held with the Division of Community Health at the Ministry of Health to get a buy in. The project objectives were presented and approval to proceed granted. County level engagement meetings were held with the CEC Health and county health management teams (CHMT). Identification of specific community units to involve in the study was decided by the CHMT.

Study site

The study was conducted in a rural area in Tana River County. Tana River County is located in the coastal region of Kenya (see figure 1 above).

Figure 1: Location of Tana River county

The County is among the five poorest Counties in Kenya in terms of healthcare investments and health indicators (13). The literacy rate is 34% and 77% the population live in poverty. Malaria is the most prevalent disease, 19% of children are underweight and under-five mortality rate is 87/1000 (14) (table1).

Table 1: Tana River County demographics and health parameters

Table 1. Tana River County demographics and health parameters (14–16)	
Population	280,481 [1]
Under 5 children	45,438 [1]
% of the population living in poverty	77 %[2]
Ranking in wealth in Kenya (of 47 counties)	43 [2]
Population growth rate	2.8 %[2]
Number of public hospitals	47 [2]
No of public health centres	5 [2]
No of dispensaries	40 [2]
No of doctors (per 100,000 people)	1 [2]
% of births attended by skilled attendants	31.6% [1]
Most prevalent disease	malaria (64% of morbidity) [1]
% of children <5 sleep under ITTNs	15% [2]
% of children underweight	18.6% [3]
Under-five mortality rate	87/1000[1]
Sources: **[1] MOH 2015** **[2]GoK, 2013. Tana River County Integrated Development Plan** **[3]KNBS, 2014. FAST FACTS FROM THE 2014 KENYA DEMOGRAPHIC AND HEALTH SURVEY**	

Shortage of healthcare staff and specialized medical equipment, as well as medical commodities, poor health seeking behaviour, illiteracy and substandard referral systems are among the challenges in the County healthcare provision (13). The County was also selected due to the presence of the Kenya Red Cross Society, the partners overseeing the on-going iCCM project in the County.

Study Description

The initial plan was to conduct the study over a 7 month period, but study timelines shifted to 11 months (Dec 2019 – October 2021) necessitated due to the mitigating measures towards the COVID-19 pandemic and nurses' strike

The study comprised of three main phases, a baseline survey, an implementation phase and an end line survey. This report details the results from all three phases.

Baseline survey

At baseline quantitative and qualitative survey was conducted between 2nd – 6th December 2019. This involved structured and open-ended interviews and focus group discussions with CHVs working on the ICRBP iCCM project, their Community Health Assistants, health workers from the link facilities and members from the Bura Sub County Health Management Team (SCHMT). This survey collected information on the current status of the CHV operations, the motivating factors and the presumed reasons for attrition from the community units at baseline. Upon completion of the baseline survey,

community units were randomly allocated to one of the study arms.

Implementation Phase

The implementation phase involved equipping the CHVs with the Philips outreach kit, career enhancement and mentorship activities. This phase lasted a period of 11 months (Dec 2019 – Oct 2020). Implementation began on 9th December after the completion of baseline survey. Participants were assigned to three study arms according to the community units they belonged to with each study arm having 1-2 CHAs and 21 CHVs; one study arm received the mentorship and career enhancement sessions, the second study arm received outreach kits and the third study arm was the control arm which had no intervention.

One CHA and twenty-one CHVs from Biskidera CU were assigned to the intervention arm receiving the Philips outreach kits. Each CHV received an outreach kit.

The Philips Outreach kit (Backpack) is a water resistant padded bag which contains equipment including a mid-upper arm Circumference (MUAC) tape, under arm thermometer, blood pressure monitor, pulse oximeter, Child Automated Respiratory Monitor (ChARM), a splint, a solar lamp and panel. The purpose of the outreach kit is to support CHVs in their efforts to triage, diagnose at the community level before administering treatment for iCCM or before referring clients to the health facilities (18).

Figure 2: Philips Outreach Kit

They also received training on the clinical aspects as well as application training on the specific use of the equipment in the outreach kits.

Upon recruitment to the ICCM program, all CHVs were expected to diagnose malaria, pneumonia, diarrheal diseases and malnutrition, treat where possible and refer severe cases to link health facilities

(28). This is done mostly by observation with no equipment provided to aid with diagnoses. CHVs reported using their hands to check for fever or hot body and relied on counting breaths per minute to check for pneumonia which proved difficult to do with a sick fidgeting child. Malnutrition was mostly assessed by observation without any accurate estimation of weight or nutritional depletion due to lack of enough MUAC tapes. After training, CHVs were requested to continue with their duties in the iCCM program incorporating the use of the equipment in the outreach kit. Provision of a thermometer to the CHVs enabled accurate identification of fevers before testing for malaria using RDTs. The ChARM was used in accurately estimating the breaths per minute in infants especially those who moved around a lot. This measure was supplemented by the oximeter which gave an estimate of the oxygen saturation. Measures were triangulated to provide a more accurate pneumonia diagnosis. Assessment of malnutrition was facilitated by checking the weight for age using the weighing scale provided in the outreach kit. The waterproof and tearproof MUAC tape simplified assessment of mid upper arm circumference when checking for malnutrition. In addition to the iCCM activities, use of the outreach kit expanded the scope of the CHVs. Using the blood pressure machine, the CHVs were able to screen for high blood pressure and refer community members for further assessment and management at the health facility.

CHVs in this arm of the study used the kit throughout the study period with a few interruptions such as restriction in movement and suspension of household visits due to Covid-19 pandemic

Insights from international stakeholders in community health work tasked with identifying potential interventions that could be tested through trials suggested that frequent (more than one supervision visit) and sustained supervision is important for CHV motivation. Additionally, providing CHVs with training in areas not directly relevant to ICCM but identified by CHVs as beneficial in generating supplementary income such as agriculture and livelihoods has the potential of motivating CHVs and enhancing retention rates by reducing their need to pursue alternative income generating activities. This was the basis of the mentoring and career enhancement intervention.

All 21 CHVs from Meti community unit were assigned to the mentoring and career enhancement intervention arm. This intervention was meant to address topics outside the scope of CHV work particularly CHV welfare needs and to establish a stable income/livelihood base so that the need for income as a reason for attrition is reduced. The career enhancement targeted imparting CHVs with skills they could use beyond the CHV work within their daily lives to sustain themselves and if possible, produce a little extra to trade. The CHA conducted mentorship priority analysis meetings

where the CHVs selected agribusiness and livestock farming (specifically poultry farming) as a priority area where mentorship was required.

The mentorship intervention as a package included facilitation of the CHA to conduct more regular supervision meetings with the CHVs, conduct mentorship priority analysis meetings for selection of preferred topics for mentorship and supervise actual mentorship sessions facilitated by technical support officers from the county government. Periodic mentoring sessions were conducted by agronomists from the county. The theory sessions on agriculture included: -

- Land preparation,
- Nursery preparation
- Seedling transplanting
- Use of fertilizers and chemicals
- Weeding, pest and disease management
- Maturity harvest and storage
- Costing and marketing of farm produce

Figure 3: CHV mentorship meetings and practical field activities

Status quo was maintained for CHVs in the community unit assigned to the control arm. Specifically, they continued with their activities within the iCCM program including household visits, management of specific childhood illness in the community, attending supervision meetings and reporting to the CHA as they had been doing without introduction of any interventions. They also continued to receive the stipends for six months similar to the other CHVs in the intervention arms.

Study implementation was heavily impacted by the COVID-19 Pandemic and a health workers' strike which resulted in shifted timelines. For approximately 3 months between mid-March to end of July 2020, CHVs could not adequately conduct household visits or attend some of the meetings which were part of the study interventions. To compensate for the study time lost, the study timelines were extended from July 2020 to October 2020.

End line survey

An end line survey was conducted in October – November 2021 after 11 months of study implementation. During the end line survey, structured interviews, in-depth interviews and focus group discussions were held with the CHAs, CHVs, PHC providers the sub-county health management team.

Ethical considerations

Internal ethical approval was sought from the Philips Internal Committee for Biomedical Ethics (ICBE). External ethical approval and was sought from AMREF ESRC and NACOSTI before the study began. Written informed consent was sought from all potential participants before recruitment into the study. Participants kept one copy of the signed consent and another copy was kept by the investigators. Participation in the research study was voluntary and no coercion was used; and the risks and benefits of the study were described to the study subjects. Participants were informed that they were free to withdraw from the study at any time.

Data management and analysis

Quantitative data was analyzed using STATA 15.0. (College Station TX United States of America). Fisher's exact tests and chi square were used to test for observed statistical differences between groups. P value of less than 0.05 was considered statistically significant.

Qualitative interviews recorded on voice recorders were transcribed into word files. Word files were loaded onto NVivo software for analysis. Transcribed discussions and interviews were coded using preliminary coding scheme. The scheme was informed by the themes pre-identified in the qualitative study guides. The findings from the qualitative data were triangulated with the quantitative results

Chapter 4 : RESULTS

The baseline survey was conducted from 2nd December 2019, implementation started on 9th December 2019 and the end line survey was conducted in October and November 2020. The study targeted CHVs who had been working on the iCCM project in Tana River since 2017. The study participants were selected from four community units, Biskidera and Meti intervention community units and Bilbil and Dukanotu as the control community units. All sixty-three (63) community health volunteers within the iCCM project in Bura sub county were eligible to participate in the study. Of the sixty-three CHVs sampled to participate in the study, fifty-nine participated in the baseline survey and only 52 participated in the end line survey. The remaining four CHVs who did not participate in baseline could not be reached because some were unwell, and others had travelled out of the CU briefly for an emergency. The eleven CHVs who were unavailable at end line could not be reached because they were either too ill to be interviewed, taking care of an ill relative out of CU, had briefly travelled out of the CU or had migrated far way into the study site with other community members as pastoralists at the time of the survey. However, despite missing out on the baseline and end line, all 63 CHVs participated in the project activities.

Participant characteristics at baseline

Out of the initial 63 CHVs selected, 40 (63%) were male and 23 (37%) female. A total of 59 community health volunteers participated in the baseline survey. Table 1 depicts participant profiles at baseline.

Table 2:participant characteristics at baseline

Characteristic	Meti Outreach kit (*IG) n (%)	Biskidera Mentoring (*IG) n (%)	Dukanotu/Bilbil control (*CG) n (%)	Total N (%)	Fisher's P value
Age					
<25 years	3 (14)	0 (0)	0(0)	3 (5)	
25-34years	3 (14)	5 (29)	5(24)	13 (22)	
35-44 years	12 (57)	8 (47)	12 (57)	32 (54)	
45-49 years	1 (5)	1 (5)	3 (14)	5 (8)	
>49 years	2 (10)	3 (18)	1 (5)	6 (10)	0.456
Gender					
Male	14 (67)	10 (59)	18 (86)	42 (71)	
Female	7 (33)	7 (41)	3 (14)	17 (29)	0.166
Marital status					
Single	4 (19)	2 (12)	2 (10)	8 (14)	
Married	17 (81)	15 (88)	19 (90)	51 (86)	0.720

Education level					
No formal schooling	0	0	6 (29)	6 (10)	
Primary	14 (67)	11 (65)	13 (62)	38 (64)	
Secondary	6 (29)	6 (35)	2 (10)	14 (24)	
Tertiary/postgraduate	1 (5)	0	0	1 (2)	0.012
Have Source of income					
Yes	11 (52)	8 (47)	14 (67)	33 (56)	
No	10 (48)	9 (53)	7 (33)	26 (44)	0.509
Occupation					
Unemployed	17 (81)	17 (100)	18 (86)	52 (88)	
Self-employed	3 (14)	0	1 (5)	4 (7)	
Employed	1 (5)	0	2 (10)	3 (5)	0.382
Children					
No children	2 (10)	0	4(19)	6 (10)	
1-5 children	10 (48)	8 (47)	8 (38)	26 (44)	
>5 children	9 (43)	9 (53)	9 (430	27 (46)	0.479

* CG: Control Group; ** IG: Intervention Group

In general, participants across all study arms had similar demographic characteristics. Table 2 below shows a comparison of the demographic characteristics at baseline and end line.

The proportion of female CHVs who participated in the end line survey was slightly higher (29%) compared to the baseline (33%). However, despite one of the intervention community units having higher number of female CHVs overall, there was no statistically significant difference in the distribution of males and females across all three CUs. Participant ages ranged between 22 and 73 years with a median of 40 years. The age profile of CHVs was similar across all three community units during the study (x2=9.5, P value= 0.229).

There was no change in marital status and number of children during the study period with 86% of the participants married and living with their spouses and about half of the participants having more than 5 children.

Overall, about 90% of the participants reported having received primary school education, a quarter had completed secondary school and 3% had tertiary training. Participants education remained the same during the study period. Only six participants from the control site had no formal schooling.

At baseline, 88% of the participants were unemployed, with only 7% reporting self-employment. There was a significant difference in this proportion at end line with an extra 15% of the

participants reporting gaining self-employment. Proportions were similar across all study arms.

Table 2 below shows a comparison of demographic characteristic at baseline and end line.

Table 3: Comparison of participant characteristic at baseline and end line

Characteristic	Study period Pre (Baseline) (n%)	Post (End line) (n%)	**Total** N (%)	**Fishers test P-value**
Age				
<25 years	3 (5)	1 (2)	4 (4)	
25-34years	13 (22)	12 (23)	25 (23)	
35-44 years	32 (54)	24 (46)	56 (50)	
45-49 years	5 (8)	2 (4)	7 (6)	
>49 years	6 (10)	13 (25)	19 (17)	0.229
Gender				
Male	43 (71)	30 (58)	73 (67)	
Female	16 (29)	22 (42)	38 (33)	0.120
Marital status				
Single	8 (14)	7 (13)	15 (14)	
Married	51 (86)	45 (86)	96 (86)	0.564
Education level				
No formal schooling	6 (10)	6 (12)	12 (11)	
Primary	38 (64)	29 (56)	67 (60)	
Secondary	14 (24)	15 (29)	29 (26)	
Tertiary/postgraduate	1 (2)	2 (4)	3 (3)	0.767
Have Source of income				
Yes	33 (56)	43 (83)	76 (68)	
No	26 (44)	9 (17)	35 (32)	0.002
Occupation				
Unemployed	52 (88)	29 (56)	81 (73)	
Self-employed	4 (7)	20 (39)	24 (22)	
Employed	3 (5)	2 (4)	5 (5)	<0.001
Casual	0 (0)	1 (2)	1 (1)	
Children				
No children	6 (10)	3 (6)	9 (8)	
1-5 children	26 (44)	22 (42)	48 (43)	
>5 children	27 (46)	27 (52)	54 (49)	0.639

Community health volunteer roles, supervision, motivation and challenges

CHV Recruitment

We investigated the source of information on the recruitment of CHVs. On average , about 66% of the participants reported receiving information about CHV recruitment from the local administrative officers, particularly the chief while others reported receiving the information through either a health worker/community health extension worker (30%) or by reading advertisements from the noticeboards at health facilities (5%). Generally, after receiving the information, as mentioned in one of the FGDs, the CHVs were selected by the community at a community meeting (Baraza).

"R8: I know that when we were being selected the report came from health department to the chief and the chief went to the headman, the headman announced to the community to select, then we were nominated at a Baraza" **FGD CHVs**

"R4: First of all, for the CHVs who started out this XX CU, there was a department of the Ministry of Health and Red Cross joined hands. After coming together, they said we want people to help the community, who are volunteers. And at the time there was no CHA, so it went through the chief and the head men... We were called by the chief and we went to the meeting. So, he asked, "Who can volunteer to help the community?" Some people raised their hands and others didn't and community members agreed..." **FGD CHVs**

We further inquired about the criteria used in selecting CHVs. The CHVs reported that some of the main considerations included age, character as perceived in the community, knowing how to read and write and experience in health work.

R6: "nowadays they like youths ... you must be 18 and above..." **FGD CHVs**

R2: "Yes, age too is a factor. If you are maybe 60 and above at the time of selection you will not manage this CHV work" **FGD CHVs**

R8: "It also depends on the character of a person. There are people with bad behavior in the community…. So, when they volunteer the people stop them, I mean the headman stops you. You might not be a good person in the community, and he will tell you not you…." **FGD CHVs**

Prior to becoming CHVs only ten participants had been working; seven on paid employment and three on volunteer basis. Most of the CHVs reported that the desire and passion to assist the community and encouragement by other community members were the key reasons that drove them to initially become CHVs. Some volunteers mentioned the hope for career advancement, recognition by community members and receiving a salary, stipend or token as the other factors that motivated them to initially become CHVs.

We also sought to know the participant's desires and expectations upon joining the iCCM program as CHVs. The most commonly mentioned expectation was receiving training to become a qualified health practitioner. Figure 2 below shows details of other expectations from the CHVs. At baseline, about two thirds of the participants felt that the iCCM program had not met their initial expectations. The proportion significantly reduced at end line with only one third reporting that their expectations had still not been met.

Table 4: Participant recruitment, roles and supervision

Characteristic			Total	P-value
Total Duration as a CHV	**Baseline (N%)**	**End line (N%)**	**(N%)**	
Less than 6 months	1 (2)	0 (0)	1 (1)	
6 months - 1year	2 (3)	1 (2)	3 (30	
1 - 3 years	10 (17)	4 (80	14 (13)	
More than 3 years	46 (78)	47 (90)	93 (84)	0.350
Source of recruitment information				
Through CHEW/HW	20 (34)	12 (23)	32 (29)	
Through Chief	36 (61)	37 (71)	73 (66)	
Notice at HC	3 (5)	3 (6)	6 (5)	0.454
Trainers				
MOH	33 (56)	23 (45)	56 (51)	
NGO	26 (44)	28 (54)	54 (29)	0.257
Reaction to roles				
Manageable	53 (91)	50 (96)	103 (94)	
Not manageable	2 (3)	0 (0)	2 (2)	0.374
Not sure	3 (5)			
Ever dropped out				
No	57 (97)	51 (98)	108 (97)	
Yes	2 (3)	1 (2)	3 (3)	0.634
Previous employment				
Yes	9 (15)	1 (2)	10 (9)	
No	50 (85)	51 (98)	101 (91)	0.014
CHV hours per week				
1-3hrs	8 (14)	12 (23)	20 (18)	
4-8hrs	12 (20)	20 (39)	32 (29)	
More than 8hrs	39 (66)	20 (39)	59 (53)	0.014
Supervision visits in previous month				
None	5 (8)	2 (40	7 (6)	
Once	34 (58)	17 (33)	51 (46)	
Twice	10 (17)	27 (52)	37 (33)	
Thrice	7 (11)	2 (4)	9 (8)	
More than thrice	3 (5)	4 (8)	7 (6)	0.002
Proposed supervisory visits per month				
Once	10 (17)	3 (6)	13 (12)	
Twice	33 (56)	28 (54)	61 (55)	
Thrice	9 (15)	14 (27)	6 (12)	
More than thrice	7 (12)	1 (2)	1 (1)	0.205

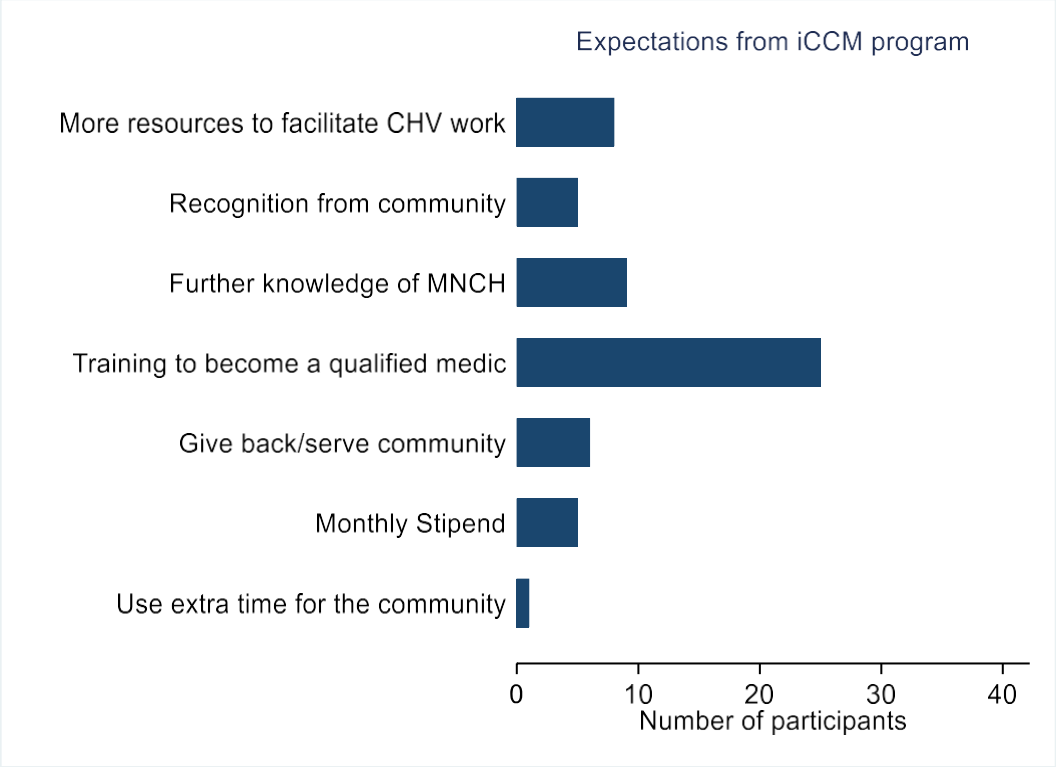

Figure 4: CHV expectations from iCCM program

At end line, participants reported having worked as CHVs for a duration as short as 1 year and as long as 25 years overall with 90% having more than 3 years' experience. During the project period, some of the CHVs who had dropped out were replaced by CHVs who reported working for less than 3 years as CHVs.

An average attrition rate of 4.76% over a period of 4 years was estimated from structured and unstructured interviews. Overall, five CHVs reported having felt like dropping out during the project period. However, only three CHVs reported actually dropping off from the CHV work at least once during the project period. It is important to note that the CHVs later rejoined the CU. The maximum duration of the dropout was six months. We estimated a dropout rate over the four years of between 4.76% and 6.34% across the three CUs. Meti (intervention) and Bilbil/Dukanotu (Control) CUs reported the highest attrition rates. Among the reasons given for feeling like dropping of or actually dropping off were financial constraints, discouragement from CHV work by family members, inadequate appreciation, illness and conflicts with the CHA.

Training

After recruitment, the CHVs were trained and assigned roles and responsibilities which they all felt were manageable. Besides the one participant who joined the iCCM program just before the study began, all other CHVs reported having received training on the formal CHV modules at least once facilitated either by the Ministry of Health (45%) or by an NGO (54%). A CHV explained the importance of training as detailed in the excerpt below: -

> *"One thing happens, because when you are chosen, the first thing to know is you cannot be chosen for no reason. …there has to be something you are required to do. So, if you are selected, the people who want you must tell you what you are going to do. You have to be trained on your job. Everyone has their limit. …there is a boundary you should not cross because you have your limit, because you have your work. The doctors have their work. And truth be told we had a lot of training. There is training that health workers will train you and tell you your job is this and this. So, you must know your responsibilities first"* ***FGD CHVs.***

As mentioned by some of the key informants below, trainings were facilitated mostly by NGOs or partners and rarely by the county health department or MOH.

> *"…. we look for a partner who can train them because the ministry so far has never trained the CHVs here…Okay in some CUs where there are no partners, so as a CHA you do an on-job training. Like you call meetings that you tell them their responsibilities, they select the villages, the key messages to take to the households. So you go with them as you do the meetings. But if it so happens that you have a partner it's so nice because the partner is able to train them, to give the reporting tools…"* ***IDI, CHA***.

Overall, 98% of the participants reported receiving a verbal description of the roles of a CHV at the time of recruitment. Roles were communicated by either the CHA or fellow CHVs. One of the CHVs mentioned that they did not receive any document detailing the specific roles of a CHV.

> *"R5: For now, there is no document that has been issued to CHVs. But for those who have attended the community health strategy workshop; they have been read to their responsibilities"* ***FGD CHVs***.
> *"R2: …. When I was selected, I found others who had come before me. And they were the first ones who 'orientated' me and told me in this job that you have been selected there is this certain work and certain work…"* ***FGD CHVs.***

Further trainings reported by the CHVs received during the iCCM program implementation were facilitated by KRCS and were focused on specific health topics such as WASH, nutrition, or specific illnesses such as malaria, cholera, diarrhea or polio.

Supervision

All participants interviewed confirmed that the immediate supervisor of the CHVs work is the community health assistant (CHA), an employee of the MOH, followed by the health officer in charge at the link facility and on a quarterly basis the county health management team (CHMT).

> *"R8: Basically, we have one meeting in a month with the CHA but that is not the only supervision. A lot of times, we communicate with her via phone and she might also come depending on the need but the important one is the main meeting…"* ***FGD CHVs.***

The frequency of supervision varied across the different study arms. At baseline, more than half of the CHVs reported receiving only one supervisory visit the previous month. Due to the mentoring and career enhancement intervention which included an aspect of increased supervision visits, the number of supervisory visits significantly increased over the study period, averaging to two supervisory visits per month at end line (P = 0.001, Fisher's exact test). At end line, majority of the CHVs preferred having at least two supervision visits per month but a few (13%) requested more than two visits per month.

During the discussions, the CHVs stated that supportive supervision involved checking CHV records, monitoring commodities, solving issues from the community, and updating the information on case management. This was reiterated by one of the key informants who stated:

> *"R1: Okay like whatever they did last time it was monitoring. They were trying to monitor challenges. … you know there are those challenges that someone faces at work. They usually follow up, with the public health officers as well., every month they usually plan… you hear that we are going to the community for this purpose…*" **IDI CHA.**

To provide supportive supervision, the CHA indicated that they required facilitation in terms of transport, provision of reporting tools for both CHVs and CHAs and prompt replacement of supplies and commodities.

Challenges

Although CHVs had a passion to serve their community voluntarily, they reported facing a variety of challenges during implementation of their duties. Some of the challenges mentioned included financial constraints and lack of financial motivation, lack of supplies, lack of support from the community and for majority of the participants, lack of transport facilitation due to the long distances they had to cover during their work. They also felt that these challenges could lead to attrition especially among the weaker CHVs. Figure 5 below shows some of the challenges reported by CHVs.

Two of the overarching challenges mentioned at both baseline and end line were lack of supplies and lack of transport facilitation to move around the CU as aptly reported by some of the CHVs during FGDs:

> *"R1… it reaches a time where there are no drugs in the hospital, and it's as if the devil knows there are no drugs at the hospital because he comes and overwhelms the villages. You find a mother has brought a child and there is no medicine to help. There is no Panadol and sometimes he is vomiting, he might have diarrhea but there is no ORS or Zinc nothing for iCCM. Sometimes we have those RDT for testing malaria but there is no buffer. So those are challenges that we experience…",* ***FGD CHVs.***

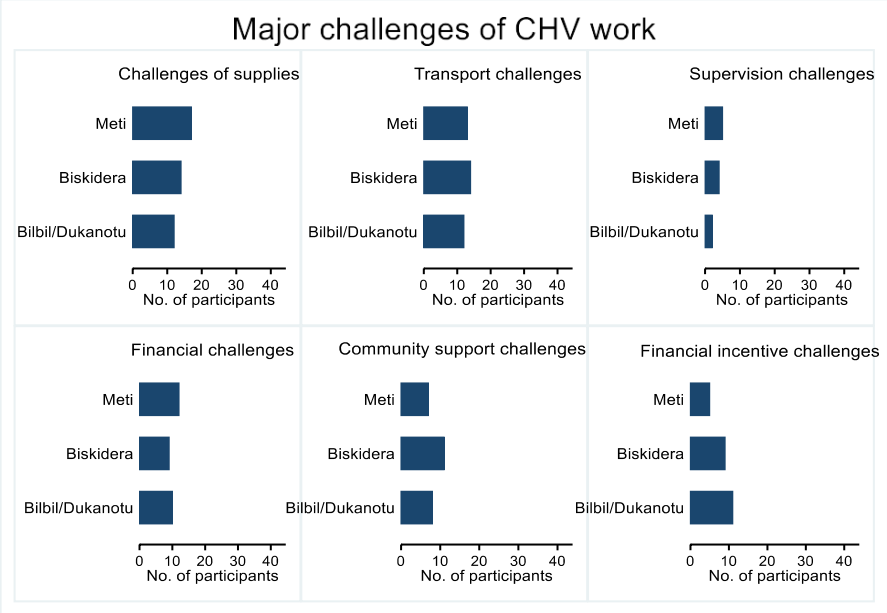

Figure 5: Challenges of CHV work

Financial challenges were also sounded high by participants during the FGDs and mentioned in the excerpt: -

> *"R8: And also you know you cannot lick an empty hand, so you find a lot of times there is voluntary work but because you have your personal needs you have to put that service that is needed urgently on hold and do something else first because of your children's needs and your needs. So at least that financial constraint of CHVs is a challenge. Because you will find that you have gone to talk about health but at home your children are not eating healthy you see, and the community expects you to lead by …" FGD CHV*

Other minor challenges mentioned included lack of identification badges/tags or attire causing conflict during household visits as explained by one of the CHVs during the FGDs:

"R1: Another challenge is identification. You can go to a mother just dressed like this to talk about a problem or an outbreak or to check on pregnant women or children under five. If you don't have anything to show that you are from the health department, it becomes very hard to convince that person until they understand. …if we could get something to put on for example a T-shirt or a tag like the one for Red Cross. We should be given a tag to show that I am a health worker to make our work easier" ***FGD CHV.***

Table 5: Previously received motivations and challenges

Characteristic	Intervention		Total	P-value
Motivations previously received	Baseline (N%)	End line(N%)		
Airtime for communication	12 (20)	2 (4)	14 (12)	0.009
Transport reimbursement	19 (32)	26 (50)	45 (41)	0.057
Trainings	49 (83)	46 (87)	95 (86)	0.418
Career Opportunities	5 (8)	2 (4)	7 (6)	0.317
Consumable commodities	1 (2)	14 (27)	14 (14)	<0.001
Tools and equipment	13 (22)	11 (21)	24 (22)	0.911
Major challenges				
Financial constraints	9 (15)	31 (59)	40 (37)	
Lack of transport facilitation	19 (32)	39 (75)	58(54)	
Lack of supplies	11 (19)	43 (82)	54 (51)	
Lack of support from community	11 (19)	26 (50)	37 (35)	
Lack of financial motivation	9 (15)	25 (48)	34 (32)	<0.001
Impact of removal of stipends				
Increased motivation		6 (12)	6 (12)	
No difference in motivation		21 (43)	21 (43)	
Reduced motivation	-	22 (25)	22 (45)	-

Motivation

As regards remuneration, nearly a third of the participants indicated that they had received some form of payment for their work as CHVs at baseline. The payment they referred to in most instances was received once during the iCCM program and was in the form of a stipend. The proportion of participants who reported receiving some form of remuneration/payment for their work was significantly higher at end line and was in the form of airtime. However, similar to sentiments at baseline, the participants felt the remuneration was not adequate or commensurate to their work. We asked the CHVs to comment on the level of motivation after the cessation of stipends from May-October 2020. About 1 in 10 of the CHVs reported that their motivation had increased. These were CHVs from intervention arms of the study. On further probing, they explained that despite the lack of stipends, their motivation had increased due to the interventions they had received. About 45% of the CHVs indicated a slight reduction in motivation as a result of cessation of stipends. The remaining 43% felt that lack of stipends had no impact on their motivation at the end of the study. We noted that 76% of the CHVs from the control group felt that lack of stipends had no impact on their

motivation. However, this is to be interpreted cautiously due to the challenges of delays in payment of stipends which already reduced the motivation impact of the stipends.

According to 99% of the participants, the community appreciated their work by saying thank you whenever they received CHV services. Unlike at the start of the study, at end line, CHVs also reported receiving recognition as an appreciation for their work in the community. Gifts were rarely offered as appreciation.

We sought to determine the factors that motivated the participants to continue working as CHVs years after they had been recruited on the iCCM program. At baseline, most of the CHVs outlined the passion to serve the community and recognition by community members, as the key motivators to continue doing CHV work. The desire to gain knowledge on maternal newborn and child health and trainings emerged as other key motivators at end line. Figure 4 below shows a comparison of motivators at the start and end of the study. There was a statistically significant difference in reported level of motivation from motivators across the study arms at before and after the interventions. Overall, more CHVs reported that trainings, stipends, recognition in community and gaining knowledge in maternal and child health motivated them to continue CV work.

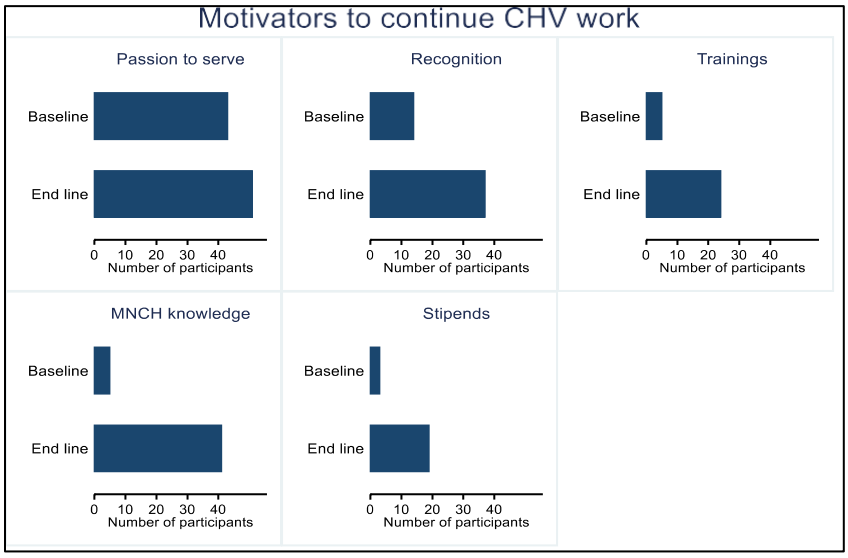

Figure 6: Motivators to continue CHV work

At the end line evaluation, all CHVs had all their outreach kits intact. Initially, participants received a one-day training covering the clinical and application aspects of the equipment which they felt was a crash program. Refresher training on the use of the kit was conducted upon request. On average,

participants preferred to have the training over three days.

We sought to find out the participants' initial impression of the outreach kit. Majority reported mixed feelings; excitement with fear that it would be hard to master using all the devices in the outreach kit. This fear was dispelled after the training and some practice in the community.

Philips outreach kit intervention group

Participants reported that the most used equipment in the outreach kit were the MUAC tape, the weighing scale, thermometer and the ChARM because these were very relevant for the iCCM work. The least used equipment in the outreach kit were the pulse oximeter and the splint.

Referrals to the health facility improved in quality and assisted health workers in prioritizing emergency cases by observing the triage measures provided by CHVs on the referral forms. In addition, the outreach kit provided an opportunity to impart more knowledge directly relevant for their roles as CHVs.

Participants reported an increase in workload particularly related to blood pressure monitoring for adults who had been diagnosed with the condition in the community. They encountered some challenges with the equipment in the outreach kits particularly the solar lamp which could not maintain charge for more than 30 minutes. Challenges with the other equipment were mainly related to battery drain which prevented their use periodically until replacement by the study coordinator. However, the quality of the replacement batteries selected was of poor quality and drained within a week. The weighing scale, blood pressure monitor and the ChARM drained battery the fastest. As such most of the equipment could still not be used as was intended. The CHA suggested replacing some of the equipment with chargeable versions. Having participated in the clinical training sessions, CHVs reported an improvement in the relationship between them and the health workers in the link facilities. In respect to integration with the health system, the CHVs had this to say:

> *R8: In fact, while we were having the refresher course the doctors told us that they don't even have the instruments that we have at their facilities. Anytime we indicate the measures, that makes their work easier. Because they manage immediately",* ***FGD CHV.***
>
> *"R4: So, to say the truth, the devices help. They help a lot. Even with recommendation from the MOH outpatient department. You find that they recommend that if there is a way– even if someone is to come from community to hospital, at least pass through the CHV to first do the triage and whatever and then when they get there it is just managing"* ***FGD CHV***

In depth interviews with the health workers informed us that the health facility valued the work of

CHVs especially in carrying out a bit of 'triaging' in the community as stated by one of the health workers below:

> *"R3… they reduce the workload at our health facility. In fact, in these facilities, me as a clinical officer, I'll be happy when I'll attend to 10 patients unlike maybe when we didn't have a CHVs, I would have a line maybe of 20 or 50. So we are happy that the workload has reduced. Since I am getting the serious cases because that's what I want, not minor-minor issues, which can be solved by the CHV at home. So, it is helping, and we really appreciate"* ***KII Clinical Officer***

CHVs unanimously agreed that there had been an increase in workload though manageable as explained in the excerpt below:

> *"R1: By the way, the workload has increased, let's not deny that the workload has not increased because in the past, we didn't have these things of measuring weight, pressure and all that but even then we don't mind because our knowledge has increased as well"* ***FGD CHV.***

In the matter of community perception, CHVs in the FGDs mentioned that having the bag (outreach kit) increased the community confidence in CHVs. One of the CHVs commented:

> "*R7: In general, let's say that bag, apart from carrying medical equipment, it builds self-esteem. CHVs now believe in themselves better than they did in the past. And the community has been able to have confidence in those health workers… So it is something that has made the community satisfied with those services that are provided by CHVs and it has made the community to be able to listen to us…"* ***FGD CHVs.***

Effect of outreach kit on Motivation

We inquired about effect of the outreach kits on CHV motivation levels. Data from the questionnaires showed that use of outreach kits was the highest ranked motivator by CHVs from this study arm. CHVs felt that it had elevated their status to that of village doctors.

They also mentioned that it enabled them to make comprehensive referrals and not just based on their feelings. The excerpts below express some of the views of the CHV regarding motivation from the outreach kit.

> *"R7: the first thing is there is no need to go to the farm without a" jembe" (garden digging hoe) and you know that you are going to dig. So, the first motivation is that bag. Because if you have it, it will help you in providing those services. Also because of the needs of a human being, those stipends were also helping but if we look at our dedication to work, that work is more important than stipend. Like some have stayed from March until now no stipends and we are working. For me that bag is very important to us as CHVs ... If we look, at ranking mostly, it's the bag then the stipend follows,"* ***FGD CHV***

> *"R5: …even now if you say leave the bag and give assistance in another area it will be difficult because the villagers now trust us because of the bag. And this bag is the reason why we don't walk the way we used to walk in the past. Because in the past when you wanted any report you had to walk and look at all your houses but now it's not a must. Now I can go from here and reach home and I hear "a certain woman and a certain woman came to look for you..." And I know what brings them here, and I do my things, rest for a bit and take my machines and go look for them…"* ***FGD CHV***

The quality of the bag was applauded. CHVs felt that they could carry the equipment and all the other CHV commodities within the same bag. They mentioned that the community members considered it "a walking clinic". One of them had this to say:

> *"R6: This bag is not like the other ones we received from other partners which our children snatched from us to use for school, this is a special bag meant for the CHV work. No one can take it for their own use"* ***FGD CHV***

Key informants from the county health management team had mixed reactions toward the provision of the outreach kits to the CHVs. The health care workers from link facilities felt that it was a great initiative since it empowered the CHVs, motivated them and reduced the workload at the health facilities. However, others felt that some of the equipment in the outreach kit was not relevant for a CHV as detailed in the excerpt below:

> *R2: I think for the blood pressure machine, I think it's too much for them. Bearing in mind that we have been conducting some outreaches in those peripheral health facilities. Those communities, which are far from health facilities and from their health facilities, will always have an outreach. I think the outreach can do well for the community instead of having s CHV with the BP machine"* ***KII CHMT Member***

In addition to increasing motivation among CHVs, the outreach kit also increased their scope of work beyond iCCM activities to begin monitoring NCDs. This included screening for high blood pressure among adults using the blood pressure machine in the outreach kit. Once community members learnt that the CHVs had the machine, they went out of their way to look for the CHVs in their homes so as to follow up on the doctors directive of monitoring the blood pressure or beginning the screening to blood pressure before going for a consultation at the health facility.

Mentoring and career enhancement intervention group

A total of 21 CHVs were recruited to this arm of the study. CHVs were interested in both livestock and crop farming. With guidance from the CHA and sub county community health focal person the CHVs initially selected crop farming and chicken rearing as topics they preferred to be mentored in.

Due to the short study duration participants agreed to select one topic of focus. A vote was later taken among the CHVs, and they settled on crop farming. A total of 5 mentorship sessions each lasting between 1 -4 hours were held over the study implementation period. Each of the CHVs attended at least three sessions attending both theory and practical field sessions.

Upon completion of theory sessions, CHVs identified a piece of land as a demonstration farm where they practiced all the theory lessons they had learnt. Sessions were spread out over three months. On average sessions lasted three hours with the longest session (field implementation) lasting 5 hours. More than half of the participants in this study arm who were not previously farming had already applied the knowledge gained and set up their own subsistence kitchen gardens at end line. During FGDs, CHVs were asked what they thought of the mentorship and mentioned that they valued the sessions and the only aspect they would change was to increase the number of mentorship sessions and include many more topics. One of the CHVs commented as below:

> *"R9: Although that training sessions were not enough but it opened our eyes. Personally, I have started mine back at home, I even have photos I took. And it was my first time planting anything in my life*." ***FGD CHV, mentorship group.***

All CHVs felt that they had gained new knowledge from the mentorship sessions. One of them commented: -

> *"R8: The benefit we got first of all was a lot knowledge. They taught us how to start a nursery. For someone like me in the past I was not a farmer but there is training I got there like for example filling a sack with soil then inside you put kales and things like that, there is a design he taught us. So back at home, you do not have to go to the farm. That is the education we got there*" ***FGD CHV, mentorship group.***

Participants mentioned that the mentoring sessions and new knowledge did not take away time from CHV work and would not be a factor that would drive them to neglect their roles in the community.

Effect of mentoring sessions on motivation

As regards motivation, CHVs had mixed reactions. A section of the CHVs felt that the mentoring and career enhancement sessions provided adequate motivation and provided a way for them to add extra income which would increase motivation. Other CHVs remarked that they liked the mentoring sessions and acquisition of new knowledge though they would not be able to use it much because they were pastoralists who moved around frequently and did not have capital to lease land or finance the farming. This group of CHVs preferred having a stipend which would enable them buy livestock to rear.

CHVs also felt that there were a few simple incentives that would increase their motivation. These included items such as gumboots to use during the rainy season especially because they worked in flood prone areas, raincoats, flashlights/torches to use when responding to a community member at night, identification badges and labelled T-shirts to avoid suspicion by community members. CHV recognition was also a key factor mentioned as a motivator, this would be in form of badges or certificates as explained in the comment below:

> *"R: Badges and things like that, we don't have. So they say even if it's volunteering you should have something to show that you are a CHV. Identification. Even a certificate… At least to show recommendation for those years I have been volunteering myself as a CHV in this CU. This would give me morale"* ***FGD CHVs***

Provision of NHIF and NSSF cover was also mentioned as an incentive they would prefer to have.

Control group

The third study arm was the control group which had 21 CHVs. They did not receive any intervention. We observed that CHVs in this group were less enthusiastic with their work in comparison to CHVs from the other study arms. This was evident from the number of CHVs who were available for the end line survey. Two of the CHVs in the control group had relocated from their CU and moved to the township where they were running a business. They visited their CU and households in the rural area infrequently. When followed up for interviews, they said they still considered themselves CHVs, but they also had to find a way to make a living since they did not receive any payment or motivation for their work.

CHVs from this group also complained about delayed reimbursements. They mentioned having to wait for transport reimbursements for as long as four months. This was mentioned as one of the key demotivators. The stipends which had been attached to the iCCM program also delayed for months. They felt that it was not beneficial since they could not postpone their needs waiting for stipends.

Ranking of incentives and motivators

To further evaluate the effect of our interventions among other common incentives on CHV motivation, participants were presented with a list of 15 common incentives and asked to rank them on a scale of 1-4, with 1 representing least motivation and 4 representing highest motivation. At baseline, the incentive ranked highest by most of the participants was CHV knowledge transfer trainings and refresher trainings. This corresponded with their expectations from the iCCM program. Other incentives ranked very highly at baseline included income generating activities, outreach kits,

provision of a salary or stipends and provision of supplies and commodities. Reduction of CHV workload generated least motivation. A similar questionnaire was administered at end line. We sought to determine if there was a difference in the rankings at end line after CHVs had experienced some of the interventions. After analysis, the order of rankings of the incentives differed statistically between baseline and end line. Figure 7 below shows the rankings of the first four incentives related to our interventions in the study.

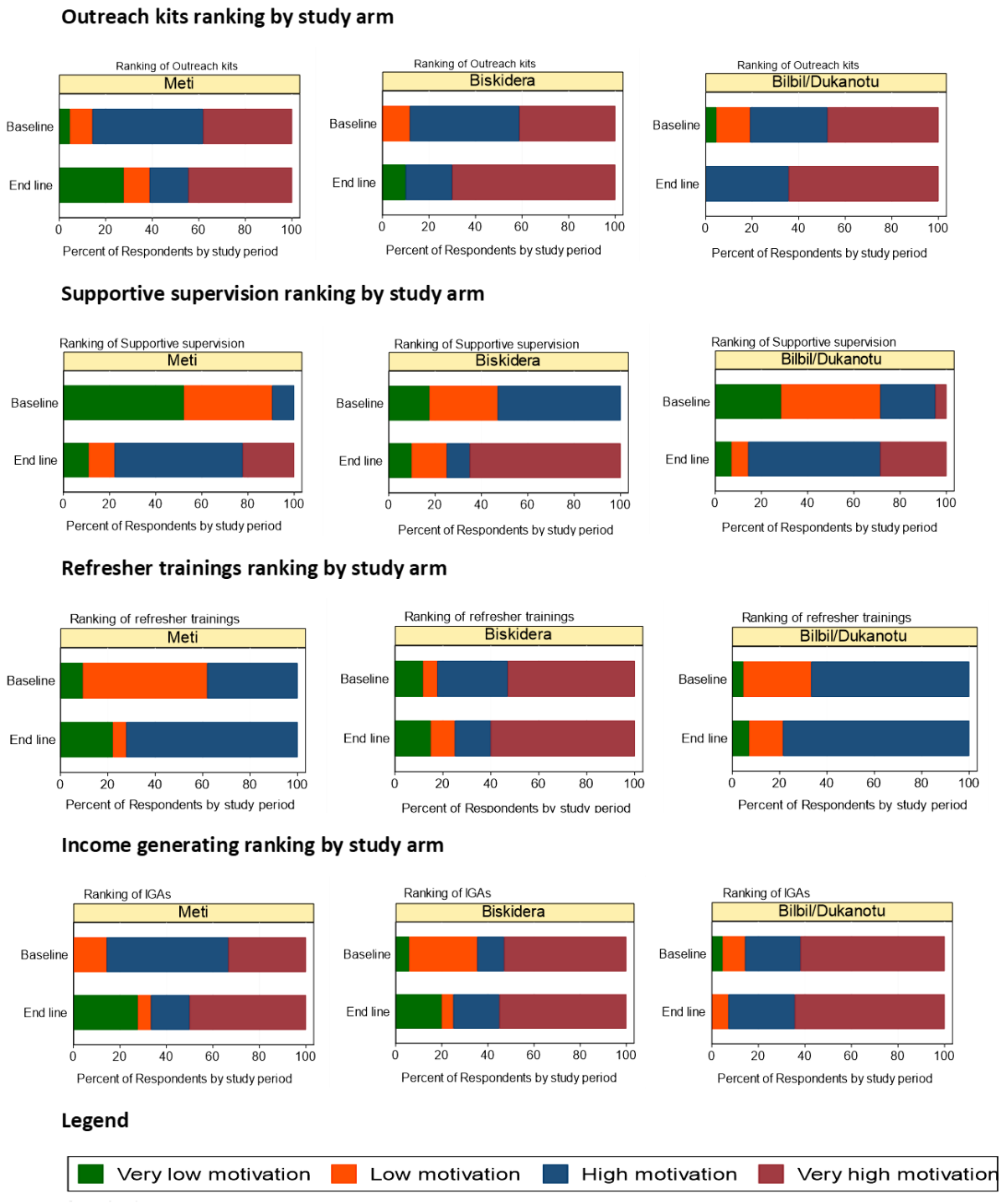

Figure 7: Comparison of ranking of incentives at baseline and end line-1

At baseline, majority of the participants from both intervention groups ranked outreach kits as a relatively high motivator. Participants from the control group felt it would provide very high motivation.

At end line we detected a statistically significant increase in the proportion of CHVs who felt that the outreach kit provided the highest motivation. This was most evident among CHVs from the outreach kit intervention arm. Comparison of the rankings of this intervention across the different study arms is shown in figure 7 above and 8 above.

Mentoring and career/livelihood enhancement intervention had two main incentives: trainings to impart skills and increased support supervision. At baseline, none of the CHVs from the mentoring intervention group felt that supportive supervision was a high motivator. At end line, after experiencing the intervention, 65% of the CHVs in the mentoring and livelihoods enhancement group felt that increased supportive supervision would provide very high motivation. Overall, there was a significant change in ranking of supportive supervision across all study arms with more CHVs ranking it as a very high motivator.

The second part of the mentoring and career/livelihoods study arm was provision of career/livelihood skills, a step away from the usual income generating activity (IGA) incentives. At baseline, trainings and refresher trainings were ranked as a relatively high motivator. At end line, only the intervention group showed a change in the ranking of level of motivation generated from trainings and refresher trainings. This could be attributed to the trainings and skills received through the mentoring and career enhancement intervention.

IGAs have previously been indicated as one of the major motivators to CHVs. We sought to know the level of motivation generated by IGAs among the CHVs in our study. When asked to rank the level of motivation expected from an IGA, majority of the CHVs ranked the incentive as generating high motivation at baseline. There was a detectable change at end line with more CHVs ranking IGAs as a very low motivator.

We also asked CHVs to rank other common incentives that were not implemented in the study as interventions. CHVs in our study had ranked salaries and stipends as a high motivator at baseline. The ranking did not change at end line. It was still considered a high motivator and ranked fifth overall. Incentives such as supplies and commodities, awards and certificates and improving the CHV selection process were thought to be average motivators at baseline. there was a significant change in ranking at end line with majority of the CHVs across all study arms feeling that the incentives would also provide very high motivation. Detail of the ranking of these motivators are shown in table 8 below.

Figure 8: Comparison of ranking of incentives at baseline and end line-2

Despite being considered a motivator by other programs, reducing CHV workload as an incentive did not seem to generate high motivation among CHVs. Other incentives ranked by CHVs are shown in figure 9 below.

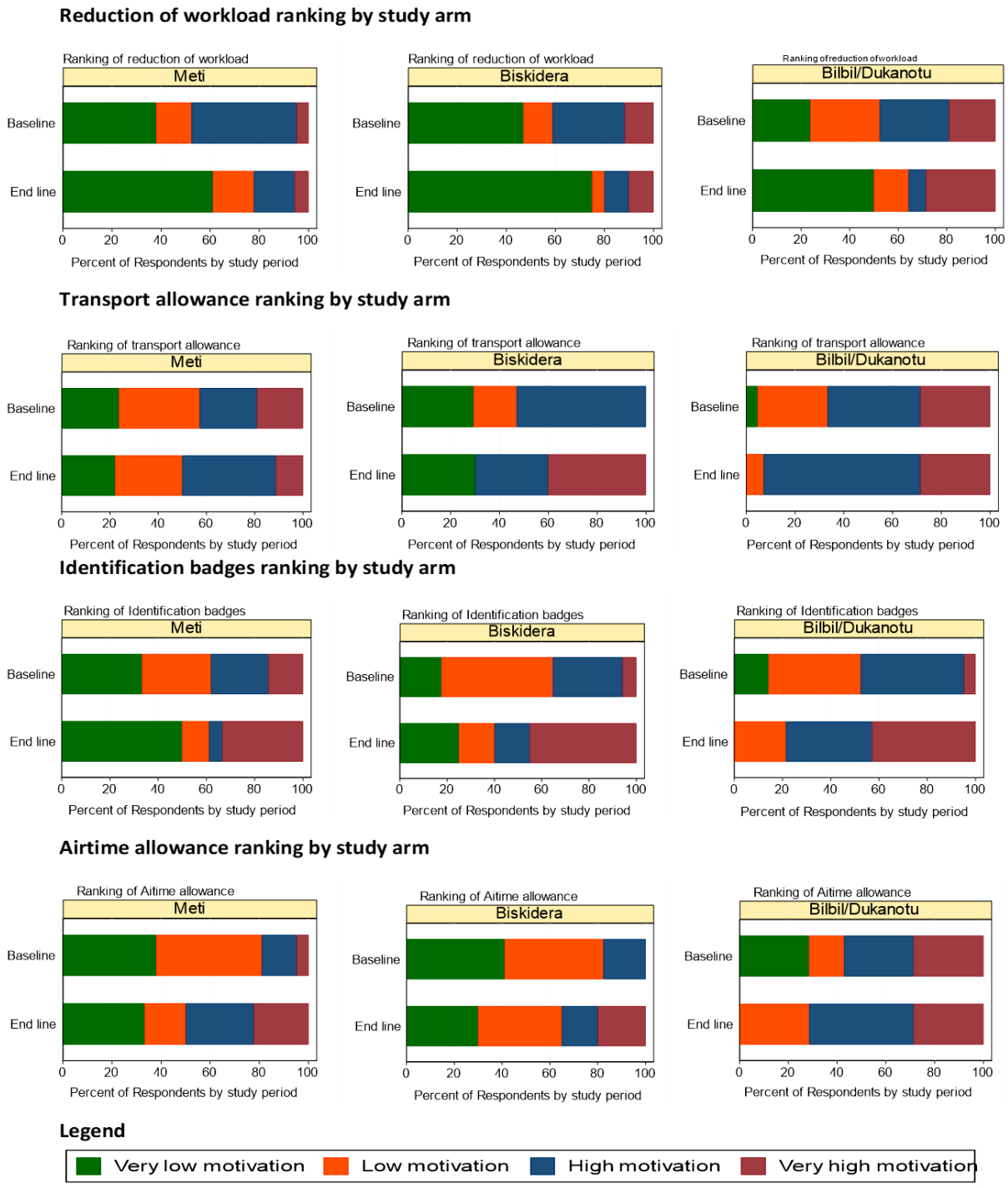

Figure 9: Comparison of ranking of incentives at baseline and end line-3

In summary, more than 50% of the participants mostly from intervention CUs felt that provision of refresher trainings, outreach kits and income generating activities would provide the highest motivation. Table 6 below shows analytical results of the comparison of proportion of CHVs' ranking of the common incentives.

Table 6: Proportion of CHVs ranking common incentives by level of motivation.

Characteristic	Baseline (N%)				End line (N%)				P-value
Motivation level / Incentive	Very low	Low	High	Very high	Very low	Low	High	Very high	
Awards and certificates	13 (22)	23 (39)	15 (26)	8 (14)	9 (17)	9 (17)	12 (23)	22 (42)	0.004
Supportive supervision	20 (34)	22 (37)	16 (27)	1 (2)	5 (10)	6 (12)	20 (38)	21 (40)	<0.001
Identification badges	13 (22)	22 (37)	19 (32)	5 (8)	14 (27)	8 (15)	9 (17)	21 (40)	<0.001
Outreach kits	2 (3)	7 (12)	25 (42)	25 (42)	7 (13)	2 (4)	12 (23)	31 (60)	0.016
Involvement in incentive selection	10 (17)	15 (25)	26 (44)	8 (14)	13 (25)	5 (10)	7 (13)	27 (52)	<0.001
Salary/ stipend	12 (20)	8 (14)	17 (29)	22 (37)	12 (23)	6 (12)	7 (13)	27 (52)	0.203
Supplies and commodities	1 (2)	8 (14)	34 (58)	16 (27)	8 (15)	5 (10)	12 (23)	27 (52)	<0.001
Airtime allowance	21 (36)	19 (32)	12 (23)	7 (12)	12 (23)	14 (27)	14 (27)	12 (23)	0.241
Reduced workload	21 (36)	11 (19)	20 (34)	7 (12)	33 (63)	6 (12)	6 (12)	7 (13)	0.009
Income generating activities	2 (3)	10 (17)	18 (31)	29 (49)	9 (17)	3 (6)	11 (21)	29 (56)	0.024
Trainings	2 (3)	4 (7)	22 (27)	31 (53)	9 (17)	1 (2)	14 (27)	28 (54)	0.050
Transport allowance	11 (19)	16 (27)	22 (37)	10 (17)	10 (19)	6 (12)	22 (42)	14 (27)	0.184
Work manuals and job aids	1 (2)	12 (20)	30 (51)	16 (27)	11 (21)	5 (10)	16 (31)	20 (38)	0.001
Improved CHV selection process	6 (10)	15 (25)	25 (42)	13 (22)	14 (27)	5 (10)	18 (35)	15 (29)	0.028
Refresher trainings	2 (3)	4 (7)	22 (27)	31 (53)	3 (6)	7 (13)	6 (12)	36 (69)	0.004

During the FGDs, CHVs also reiterated the importance of trainings in increasing motivation as explained by some of the participants:

> *"R1: Without frequent training people forget and lose motivation. So that training also contributes a lot. Because every now and then when you are called for training, you are reminded. Like the things, we were taught about children under the age of five. Every time if you are reminded you get motivation that you have been trained and you are proud of the knowledge"* ***FGD CHVs.***

During focus group discussions, participants from the control group strongly felt that provision of supplies, commodities and transport allowance would increase their motivation. This was mainly because most of them were pastoralists who moved frequently over distances as long as 30-50 kilometers. Having commodities related to ICCM would enable them to practice their CHV duties with ease. One of the health workers remarked during an in-depth interview that provision of commodities empowered CHVs and increased confidence from community members as explained below:

> "*R1: So you also find if they do not have commodities, the community at times they abuse them, they insult them saying- "you have been assisting... You are calling yourself community doctor and here you cannot assist us. Or you assisted the neighbor the other day then when I come to you it is like there is… it is not there" … such conflicts when there are no commodities discourages the CHVs"* ***IDI, Healthcare provider.***

Chapter 5 :DISCUSSION

Health ministries in Kenya and most counties in sub Saharan Africa, have adopted the use of community health volunteers as key agents of delivery of primary health care. The ICCM program is one such program where CHVs have played a critical role in its implementation. Successes have been reported in a number of African countries with remarked improvement in indicators of child morbidity and mortality (19). CHV work however remains voluntary in most settings. To maintain effectiveness and carry on the merits of healthcare achieved through health interventions such as iCCM, delivered by community health volunteers, regular motivation is required. In the wake of the Integrated Community Resilience Building Project in Tana North Sub County under which a two year successful implementation of iCCM by CHVs was run our study explored the factors that influence motivation, retention and attrition of CHVs in the health system and examined the impact of two interventions on CHV retention. Attrition was only reported during the project period but not reported during the research study period. With the exception of the death of one CHV, all the CHVs recruited to the project remained active.

Our study estimated an attrition rate of 6.3 (4/63) over the 4 years of ICCM implementation across the 4 community units. This was within the range of 3.2%-77% reported for similar studies that have investigated CHV attrition (20). however important to note was the fact that the CHVs later re-joined the program. Attrition rate from our study was only directly comparable to one study conducted at the Kenyan coast (21) but lower compared to other studies in low and middle income settings such as Bangladesh and Bhutan which reported high rates of attrition between 12% -55% and as high as 85% from a program on child survival in Ethiopia (20). Reasons for drop out varied slightly with the main reason for drop out in our study being lack of stature and recognition expressed as general inadequate appreciation. Demotivators cited in other studies included financial constraints, lack of training and supervision, interference with personal work, family pressure, lack of transport facilitation and lack of awareness on the roles of a CHV by community member to mention a few.

The process of CHV recruitment has been perceived to have a critical influence on the motivation and retention of CHVs (11). A previous program utilizing CHV services in home based care programmes in Kenya reported experiencing a high rate of attrition which was attributed to poor selection mechanisms for CHVs(22). Majority of the CHVs in our study learnt about the recruitment of CHVs from the local chiefs and were selected by the community members at community meetings based on trust and social skills. For this group of CHVs, it seemed recruitment was not based on the

MOH guidelines. Some reported being nominated by members without volunteering and had to join the program due to pressure from the family members and community at large. Despite the known benefits of participatory community selection, recruitment of this manner can have mixed effect on motivation and retention (5). CHVs could be obliged to remain in service due to the feeling of accountability to the community or drop out because of lack of personal drive to volunteer. A rigorous, criteria based CHV selection process which takes into account CHV dreams and ambitions, involves the community and the health workers in the community would result in pre-motivated volunteers likely to retain in the system.

CHVs in our study expressed reduction in zeal and motivation in their work due to unmet expectations. In light of the tasks required of them in the ICCM program, 42% (25CHVs) expected to receive extra training that would propel them to become qualified health workers while 8% expected monetary gains in the form of salaries or stipends. A review of CHV expectations upon recruitment is necessary to avoid disaffection and demotivation due to perceived unfulfilled expectations incompatible with program objectives (23). Despite understanding the voluntary nature of CHV work, CHVs still wished for monetary benefits. Expectation to receive these financial benefits festered if not clearly communicated at time of recruitment resulting in disheartenment and possible drop out. A similar multi country study investigating factors influencing CHV motivation observed that most CHVs quietly expected financial gains and hoped the financial situations would change in future (24).

An association between sociodemographic characteristics (such as gender, age, marital status, occupation) and CHV performance, motivation and attrition has been detected in previous work (21,25). Findings from a study in Kenya (21) showed that CHVs below the age of 40 were more likely to leave their CHV roles compared to their older counterparts. This was in line with our findings where majority of the CHVs who reported feeling like dropping out had a mean age of 36 years. This could possibly be explained by the fact that younger individuals are more dynamic, some with young families to provide for and lacking the patience with unpaid CHV work. Literature shows that in some settings, female CHVs are more likely to be retained compared to their male counterparts. However, our study had more male CHVs compared to women. Effect of gender on retention is dependent on the setting. Our study was conducted in a predominantly Cushitic community where women are considered home keepers. 80% of the female CHVs in the study were not originally from the county. As regards marital status, more married CHVs indicated feeling like

dropping out of CHV work. The finding was consistent with other studies (26,27) which have shown that single or divorced/widowed CHVs are more likely to drop out compared to their married counterparts.

Supportive supervision has been shown to increase motivation among CHVs. Frequency of supportive supervision was varied across the study arms. The reported increase in supervision visits at end line compared to baseline could be an artifact of the monitoring of the use and progress of study interventions. In addition, additional supervision visits and mentoring were part of the intervention on mentoring and career enhancement

Study participants felt that more supervision visits provided feedback for their work and a feeling of belonging to the health system. This would increase motivation for their work.

Insights from international stakeholders with vast experience in CHV program implementation on increasing motivation and retaining CHV pointed towards the possible merits of using non- financial incentives such as simply providing CHVs with the right tools to perform their roles (Daniel Strachan). We sought to test this theory in our study by providing one intervention group with an outreach kit. The outreach kit (18)provides a number of tools carried in a backpack which support community health workers to triage and diagnose clients and refer them for further treatment.

Provision of the outreach kit touched on many crosscutting motivation and retention factors. Provision of outreach kits ranked highest among the other incentives. The kit contributed knowledge transfer and skills development through the clinical training and application use trainings. There was a boost in CHV credibility which relies on the community perception of CHV work. With the outreach kits, CHVs got much sought after recognition and were renamed “village doctors”. Trust and confidence from the community members was enhanced when making diagnosis or making referrals a factor which boosted their morale. CHV roles expanded to looking into NCDs and serving adults as well as children when they assisted with tracking blood pressure measures for already diagnosed community members and regular screening for those with risk factors and also providing first aid with the splint for motorbike accident victims before arriving at the health facility. Despite the slightly increased workload, majority of the CHVs reported a new dynamic in their work where community members began seeking them instead of waiting for CHVs to conduct routine visits. The link and relationship between CHVs and the health system is key in the performance of CHVs. Health workers reported an improved relationship between health workers and the CHVs. This was reiterated

by the county health management team who witnessed the same during supervision visits. At baseline, CHVs from all CUs had mentioned the need for a bag to carry most of their supplies. The durability of the outreach kit bag was applauded. The CHVs felt that the outreach kit had enough space to contain the equipment and provide space for their reporting tools, supplies and commodities. One other important item in the bag was the solar lamp. Since most CHVs had no electricity in their homes, the lamp provided light for the CHVs in at home and also facilitated them to conduct night visits within their communities. This contributed to increased flexibility in working hours. Majority of the CHVs reported that the outreach kit motivated them more than the $20 stipend promised each month. Once procured, the cost of maintaining the outreach kit only included replacement of equipment batteries. Compared to the recurrent cost of providing stipends, once procured, this was a more sustainable incentive. Overall, the provision of the outreach kit improved the motivation among CHVs.

Periodic and sustained supervision of CHVs coupled with training in areas not directly relevant to CHV community work can be advantageous in generating supplementary income and has the prospect of motivating CHVs and enhancing retention rates by reducing their need to pursue substitute activities. This was one insight from international stakeholders in community health work tasked with identifying potential interventions that could be tested through trials. On this backdrop, we developed our second intervention on mentoring and career/livelihoods enhancement. The intervention was aimed at empowering the CHVs to be able to provide for themselves and their families and continue with CHV work in the absence of stipends. To promote ownership, focus areas for mentorship were identified by the CHVs themselves during monthly review meetings under guidance of officers from the department of health. The mixed demographic profile posed a slight challenge but enabled CHVs to gain skills both immediately relevant to them or to be used in future. The intervention was initially received with enthusiasm and about half of the CHVs implemented skills gained by setting up kitchen gardens and small poultry farms for subsistence use. However, some of the CHVs complained of not being able to use the skills due to lack of capital. They reported not being able to commercialize the farming soon enough. Training on formation of self-help groups and resource mobilization was provided but this did little to change the overall feeling. Although immensely grateful, at the end of the study, majority preferred improving the intervention by providing seed capital that would turn it into an income generating activity.

More effects of the intervention could be detected from the ranking of the interventions. At end line,

CHVs in the intervention groups who had experienced the outreach kit and mentoring and career enhancement ranked the incentives differently. Majority of those who experienced the outreach kit felt that it would provide the highest motivation in comparison of the other interventions. The level of motivation from supportive supervision also increased as a result of the mentoring and career enhancement intervention. There was no detectable change in the ranking of the interventions among the control group CHVs.

Study limitations

Firstly, the study was conducted during the Covid-19 pandemic which heavily affected the CHV activities and reduced the study timelines. Gatherings and meetings were restricted during the lockdown periods. As a result, mentoring sessions for the CHVs in the mentoring and career enhancement group were reduced.

Secondly, CHVs with the outreach kit could not use the intervention for a few months of the study period since household visits were not allowed. As such we might not have had enough time to evaluate the long-term effect of the interventions, Third, despite having independent interview sessions where supervisors and study implementors were absent, CHVs may have been reluctant to express dissatisfaction if they suspected that the interviewers were associated with the continuity of the program, or simply to avoid appearing discontented. Fourth, upon request from the CHVs, to prevent infection spread, infra-red thermometers were procured to replace the underarm thermometers as a measure to mitigate spread of covid-19. However, procurement timelines were too long and the CHVs did not receive them at all. Delays in the procurement of the replacement batteries required by the CHVs could also have reduced the impact of the outreach kit by reducing motivation. The poor quality of the batteries caused also caused more frustration among the CHVs.

Fifth, stipends sometimes delayed for as long as three months which caused demotivation especially in the Control group and the intervention group assigned mentoring and career enhancement who felt they could have used the money farm. Sixth, we could not adequately evaluate the effect of the interventions on retention due to the short study period. Operational challenges could have resulted in biased view of the interventions. Seventh, we had a small convenient sample size and our analysis of associations depicted may have been under-powered. Nevertheless, overall, CHVs expressed satisfaction with their participation in ICCM program would continue with the work that brought a positive impact in the community.

Lastly, the measure of CHV performance/engagement was mostly subjective and self-reported by the CHV which would have introduced an overestimation bias. We did not have a more objective measure of CHV engagement or commitment to the CHV work. We hoped to obtain information on their performance from review of records to show if they actually visited households if they reported cases timely or if referrals actually happened. However, CHV work was affected by the Covid pandemic and the records were not useful in determining level of CHV performance.

Recommendations:

Results from this study allow us to propose a few recommendations:

- Recruitment of CHVs should be based on the MOH guidelines and criteria that allows selection of CHVs with expectations in line with the program objectives to prevent dissatisfaction and drop out. CHVs should also be allowed to volunteer first instead of only being pushed into the role by the community.
- CHV expectations should be assessed at recruitment to determine their fit wit h the broader project objectives. CHVs should be informed in advance of the possibility of fulfilment of their expectations within the scope of the projects or otherwise. This prevents and reduces disappointments and dissatisfaction if expectations are not met, a factor which contributes to attrition.
- Design of community health programs should incorporate both financial and non-financial incentives for CHVs. In the absence of financial incentives, livelihoods improvement mechanisms can be used to ensure CHVs can provide for themselves and carry out the volunteer work.
- Simple items such as t-shirts, caps, identification badges, certificates have a great effect on CHV motivation
- Frequent refresher trainings are required to equip CHVs with up to date information.
- Strengthening of the health system by facilitating the community health assistants and ensuring CHV are recognized for their contribution will promote retention.

Chapter 6 : CONCLUSION:

The study contributes to the body of knowledge on factors that influence CHV motivation and attrition. We explored the effect of two interventions on CHV motivation and attrition. It was evident that both financial and non-financial incentives are important in the motivation and retention of CHVs. We demonstrate that providing simple tools and equipment such as an outreach kit as a one-off incentive can have a lasting effect on motivation by increasing confidence in their abilities to implement iCCM. This intervention also had a ripple effect toward other factors known to motivate CHVs such as trainings and skills development, recognition, community trust, and linkage to the health facility. Additionally, providing alternative skills that can be applied to generate income reduced the need for CHVs to drop of the system to pursue revenue generating opportunities. Due to the constraints of time in this study, more research is required to evaluate the impact of these interventions on retention.

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