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Performance of Community Health Extension Workers: An Observational Analytical Comparison in Different Socio-Cultural and Demographic Regions of Kenya

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Abstract

Background:

The Community Health Strategy was launched in Kenya in 2006 as a modality for social transformation to reversing the worsening health indicators. One of the human resources for health at community level introduced by the strategy to bridge the linkages between community and health facilities was Community Health Extension Workers (CHEWs). Ministry of Health in collaboration with Japan International Cooperation Agency (JICA) conducted a study to establish the current performance levels of (CHEWs) in reference to national guidelines, and identify factors influencing CHEW performance in Kenya.

Methods

Design: observational analytical using qualitative and quantitative methods. The study was conducted in different regions of nomadic, agrarian and urban slums settings. A total of 50 CHEWs and 1,545 mothers were interviewed. The quantitative data was analyzed using descriptive statistics with the aid of Statistical Analysis System and qualitative responses analyzed thematically.

Results:

Continuum of linkages was at 27% of all the CHEWs interviewed. Six in every ten (62%) of the women had four or more antenatal visits in their last pregnancy and 74% delivered by skilled attendants. Nearly two thirds (64%) of CHEWs had conducted training of Community Health Workers (CHWs) and Community Health Committees (CHC) and in the 3 months prior to survey, CHEWs had accompanied CHWs to the households median of 3 times (IQR 1.5-6) and spent a median time of 2 hours (IQR 0.45-4) with CHWs.

Conclusion:

The study concludes that continuum of linkage as key CHEWs performance is still low and recommends that they should have scheme of service and continuous training that ensures strengthening of linkages

Key Words: *Community Based Health Extension Workers, Community Health Strategy, Performance of CHEWs.*

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I. Background

Kenya has over the years trained human resources for health (HRH); including Public health officers, Public health Technicians, Family Health Field Educators, Nutritionists, Health Promotion officers and Community Oral Health officers to provide health services within health facilities vertically. However, they have not worked as integrated systems at the community level by linking community health systems with conventional health care. The country has not professionalized community health personnel work force that guarantee quality of care and with one unit of command but rather continue to deploy other cadres to perform the community tasks along their specialized and trained areas for examples Public officers, nurses as the main ones among others. The Kenya Community Health Strategy (CHS) was rolled out in 2006 and adopted Public Health and Enrolled Community Nurse Professionals as Community Extension Health workers (CHEW) to be trained to extend the services to the community and integrate it to the conventional health system. They were to bridge the gap between communities and health facilities and are critical for continuous health system improvement that guarantees access and quality health care to/for all.

In 2010, the government of Kenya developed a blue print document known as Vision 2030 with three pillars: social, economic and political. Within social pillar, are the health services which echoed community strategy as flagship project. Progressively the government introduced Economic Stimulus Program (ESP) to

boost economic growth and development from an economic downtown. The ESP was designed to jumpstart the economy towards long term growth and development. It rolled out a comprehensive program of healthcare reforms covering infrastructure development, promotion of preventive healthcare and devolved management of facilities through construction and equipping of a health centre in every constituency. The programmes employing about 2,100 new types of CHEWs who mostly had non-medical professional backgrounds (e.g. social workers and community development officers etc to add on to the public health officers/ technicians and enrolled community nurses whose training had been stopped in majority of the medical colleges in Kenya except Tambach and Mandera).

Thus the performance of CHEWs is expected to improve; service delivery by cohort through Kenya essential package (KEPH), build the capacity of the Community health workers and community health committees, strengthen the linkage between health facilities, communities and households, enhance coordination and partnership of the health stakeholders, improve the quality of Community Based health information system and improve evidence based dialogue for decision making.

In 2012, the Division of community Health Services (DCHS) with support from Japan International Cooperation Agency (JICA) Community Health Strategy project commissioned a study to determine the performance of CHEW in different socio-cultural and demographic regions of Kenya (Urban in Nairobi, Rural - agrarian in Embu and Nomadic in Isiolo).

II. Methodology

Study Design

This was observational analytical study using both qualitative and quantitative methods. It was conducted in different socio-cultural and demographic contexts in Kenya: Isiolo County nomadic, Kiambu county peri-urban, Embu County rural agrarian and Nairobi County Urban slums.

Study subjects

CHEWs were interviewed to gather 1st person information regarding their performance and factors affecting their performance. Data were further collected from focus group discussants (FGDs) constituting of CHWs, CHCs and youths. Household members (women of reproductive age 15-49) were interviewed in relation to working environment of CHEWs and how these affected their performance. Lastly, key informants (facility in-charges, focal persons, DMOH and partners) were interviewed to get additional information on the operational and policy environment surrounding CHEWs and how they translated into CHEW performance. The units of analysis were the CHEWs and households.

Sampling and sample size determination

A multistage sampling approach was used to select the assessment participants. From each region the study population was determined and the Lemeshow et al [1] formula was used to determine sample size for the households' members who mothers aged 15-49 years were perceived to be the care providers at the household levels.

All the CHEWs (50) in the study areas were included in the study as sample; purposive sampling was used to identify the policy makers who formed the Key informants (KII). Focus groups discussions 20 were also conducted. Based on the computed sample size, the sample was proportionally distributed among the 4 regions as follows:

$$\text{Embu} = (548 \times 66183)/233749 = 154$$
$$\text{Isiolo} = (548 \times 49306)/233749 = 116$$
$$\text{Kiambu} = (548 \times 29160)/233749 = 68$$
$$\text{Nairobi} = (548 \times 89100)/233749 = 210$$

Data collection tools

Structured close ended questionnaires were used to collect quantitative data from the household and CHEWs while open ended guides were used to collect qualitative data using FGDs and KIIs. A total of 20 focus group discussions (FGDs) with Community health committees, Community Health workers, Youths, Women and men and 27 key informant interviews (KIIs) were conducted at health facility (HF), district, provincial and national levels.

Data collection, quality assurance and analysis

Research assistants (RAs) were trained on data collection techniques, study protocol and pre-tested the tools and guides before administration. A supervisor was assigned to each study site to ensure compliance to the study protocol by Research Assistants during data collection. Quantitative data was analyzed using descriptive

statistics with the aid of Statistical Analysis System (SAS) computer software while qualitative data was analyzed manually by coding categorization based on the study themes (Content analysis).

III. Results

Demographics

A total of 50 out of the possible 72 CHEWs from the 4 sites were interviewed: Embu-16, Isiolo-15, Kiambu-10 and Nairobi-9. Cumulatively, there were 34 CHUs and 34 health facilities: Embu, 10 CHUs and 10 HFs, Isiolo had 9 CHUs and 9 HFs, Kiambu had 6 CHUs and 7 HFs, and Nairobi had 9 CHUs and 8HFs. The highest level of education of the respondents (CHEWs); 94% had attained college education while 6% had university education. On professional qualification, 28% were Nurses, 22% were Public Health Officers, 10% were Public Health Technicians, 8% Laboratory Technicians, 6% each were Pharmaceutical Technicians and Community Health Development personnel respectively, 4% Counselors and 2% each Health Records, Medical engineers, and Nutritionists, respectively. At household level, a total of 1,545 interviews were conducted: 539 (35%) in Embu, 297 (19%) in Isiolo, 197 (13%) in Kiambu and 512 (33%) in Nairobi.

Performance of CHEWs

Community-facility linkage structure

Continuum of linkages as conducted by CHEWs (i.e. from HH to referral) revealed that only 20% of CHEWs were involved in the whole continuum of linkages: 4 (27%) of them in nomadic and 6 (60%) of the CHEWs in peri-urban sites. No CHEW from urban slums and agrarian sites conducted the whole continuum of linkage. In the urban the youths remarked

"*The CHEW works as a link between the facility and the community. So, if there is any problem in the community, the CHEW then acts as a link between the CHW and the facility, s/he reports the problem to the head of the facility. The CHEW also coordinates CHWs work on the ground. If there is work that has been given by the facility and it requires CHWs, the CHEW is the one who coordinates and communicates, and this has to come from the facility"* youth FGD-

Role of CHEWs in maternal, child and general household health

Women with children U5 years were asked how many antenatal visits they made in their last pregnancy: 2% did not attend any antenatal clinic, 8% had one or two antenatal visits, 28% had three antenatal visits and 62% had four or more antenatal visits. A participant during an FGD in Isiolo with women had this to say:

"*Maternal and child health has really improved. Pregnant women get ITNs and are taught the importance of hand washing after visiting the toilet, how to plan their families, and children are given deforming tablets while CHEWs and CHWs are also present to ensure children go for the immunizations. We are taught on how we should treat water by putting water guard or aqua tablets and even boiling the water before use. We are also taught how to dig rubbish pits and dispose rubbish."*

The number of ANC visits by cadre of CHEWs in the specific sites (agrarian and peri urban) of OR= 0.99 and 0.86 respectively meaning ANC visit had 0.01 and 0.14 odds less likely in agrarian and peri urban irrespective of CHEW cadre. In regard to place of delivery, women in agrarian had odds of 0.42 less likely to choose place of delivery in regard to CHEW cadre while in Peri-Urban it was 0.09 odds less likely for the CHEW cadre to influence place of delivery.

Majority (92%) of respondents (HHs) knew modern family planning methods of which 86% knew and 22% currently using Pills, 89% knew injectable methods, 57% used them currently). Least known and used methods were spermicides 3% and 0.5%, and female condoms 17% and 0.7% respectively. The odds values were less likely to show any positive association between family planning uptake and CHEW cadre in agrarian and peri-urban sites while households with Public Health Technicians/ Public Health Officers CHEWs were 38% more likely to use Family Planning methods compared to those under Economic Stimulus Package CHEWs (Table 3).

Slightly more than half (54%) of mothers with children under 1 year were currently breastfeeding, 11% had introduced additional foods (other than breast milk) to their babies between 0-3 months, 17% started at 4-6 months, 36% started at 6 months, 23% started after 6 months, 0.33% did not know when they introduced additional food.

For mothers with children under the age of 5 and who had growth monitoring cards 51% had had their children weighed in the previous month and 87% of them showed upwards trend curve, 7% trend was level and 7% had downward trend curve (Table 4). At an FGD in Thika East, the women participants said that:

Our babies are now healthy because most of them were born at the health facility and we had been told of the exclusive breast feeding up to 6 months as before we gave babies food very early shortly after they are born

Water treatment and personal hygiene practices

A vast majority (84%) of the households visited had a pit latrine that was in use, and 15% did not have a latrine. Further, only 18% had hand washing tool/leaky tin, whereas 81% did not have. Regarding hand washing: 53% washed after meals, 83% before meals, 45% said after handling baby stools, 48% said before preparing food and 37% said before feeding the baby. When asked how they washed their hands, 14% used running water, 23% used running water with soap, 18% used water in a basin and 49% used water in a basin with soap.

Capacity building support to CHWs and CHCs

About two thirds (64%) of CHEWs conducted training to CHWs based on the GoK's standard training module as "initial training" with support from partners. Half (50%) CHEWs involvement in the trainings was coordination, 20% resource mobilization, 40% selection of trainees, 56% in actual trainings, 36% in report writing and 36% as CHW evaluation. In an FGD with CHWs in Isiolo concurred that they had benefited in other trainings like family planning, psychosocial support and community mobilization. One discussant said:

In my village HIV/AIDS rates was very high and people were afraid of knowing their status because they believed that HIV was witchcraft. But after training on how to mobilize community members and provide health education and positive messaging, they now believe HIV is real and are more proactive in knowing their HIV status. In one village we had four outreach services: in the 1st we tested 20 people, 2nd we tested 80 people while in the 3rd and 4th over 100 people especially the youth. They have now accepted using condoms which they initially said was denying them pleasure even married people with extra marital affairs are now using condoms.

Technical and logistical support to CHWs

Eighty two percent (82%) of the respondents (CHEWs) had accessed records for their monthly meetings (15% kept them at Community Unit office, 67% at Health Facility, 8% at home and the remainder at the PHO office). Majority (76%) reported keeping the Community Health Committee meeting minutes (76% at the Community Health Unit Office, 6% at the Health Facility, 11% at home and 7% in other places). About two thirds (64%), reported having accessible records of their dialogue day proceedings (19% at Community Health Unit office, 61% at Health Facility, 10% at home and 10% in other places). About 6 in every 10 had records of their action day activities (13% at Community Health Unit office, 67% at HF, 13% at home and 7% in other places) and (44%) had accessible records of Health Facility Committee meeting (5% at Community Health Unit office, 90% at Health Facility and 5% at home). Two thirds (66%) had accessible records for their referral systems (6% at the Community Health Unit office, 88% at Health Facility and 6% at home).

Almost all (92%) of CHEWs were responsible for producing health record for monthly meetings but assisted by the district community strategy focal person and nutritionist; 78% produced CHC meeting records, 74% produced records for dialogue days, 72% of the CHEWS produced reports for action days and were assisted by lead CHWs, 60% prepared referral while the rest were done by the facility in-charge or nurse in charge; and 38% prepared HFC meetings record.

Community Based Health Information Systems

Most of the CHEWs reported adequacy in availability of community health information system (CHIS) tools; (80%) had MOH513 tool, 82% had MOH514 tool, 78% had MOH515 tool and 72% had MOH516 tool. Further, 43% used MOH513 tool correctly, 55% fairly and 2% did not use it correctly while 45% of the CHWs under the CHEW's supervision correctly used tool MOH514, 48% used it fairly correctly and 7% wrongly used it.

Overall, form MOH513 scores above average on "good" rating regarding accuracy and completeness at 66% and 62% respectively. Timeliness for both MOH 513 and MOH514 tools were rated good by 49% and 48% respectively. Accuracy and integrity of information for MOH514 tool were rated "good" by 59% and 52% respectively. For the 3 months prior to study, 72% of the CHEWs had been involved in interpretation of data with different stakeholders and disseminated. In a KII with a person who represented facility in-charge in Thika East, it emerged that some of the health personnel team were not conversant with the entire Community Strategy as such. The same person recommended that as many health personnel as possible should be trained in this. Regarding the role of the CHEW in dialogue and action days, the key informant stated:

"There are no dialogues days here. They could be celebrated at health center but they have never been celebrated. I have only heard about a meeting in a neighboring facility where people were going for a dialogue day but did not know what they were going to do or discuss. Although I am aware that PHO, CHEW nurse and CHW attends dialogue days."

Commodity management

Overall, the CHEWs had records of most of the commodities that were in their possession. Eighty four percent (84%) of the CHUs had bicycles and 90% of the bicycles had verifiable records; 52% of CHUs had a motorbike with 92% of them having verifiable records; CHW kits, ID budge/bag and Computers all had 100% verifiable records albeit low ownership; 78% of surveyed CHEWs reported having CHIS tools and 97% of the records could be verified; and 12% had public address (PA) systems with 83% verifiable. Further, 64% of the CHEWs confirmed that the CHWs had access to these commodities whenever they needed them.

Supportive supervision and coaching

In the 3 months prior to the survey, the CHEWs had accompanied the CHWs to the households a median of 3 times (IQR 1.5-6) and spent a median time of 2 hours (IQR 0.45-4) with the CHWs. The main activities that the CHEWs and CHWs conducted during the household visits were: health education to caregivers (84%), return demonstration of health advice (68%), counseling (58%) and medical treatment (26%). The topics discussed with caregivers during these visits included maternal health (60%), breastfeeding (64%), immunization (60%), water and sanitation (8%) and nutrition (-62%). Three quarters (75%) of the CHEWs had conducted only one dialogue day in the 3 months preceding the survey while 50% had conducted 2 action days during the same period (Table 5)

Intrinsic perceived factors that influence performance

Almost two thirds (63%) of the CHEWs felt that their sex did not affect their performance at all with 29% attributing their sex to positive/ better performance, the remaining 8% said their sex negatively affected their performance. Similarly, 67% of the respondents said their age did not affect their performance while 29% said it positively affected their performance with a mere 4% saying age negatively impacted on their performance. From the KIIs and FGDs, most respondents said that CHEWs and CHWs went out of their way to offer services to the community at their own cost or at times outside their designated working times. A male discussant said

I personally know of one CHW who identified someone that had defaulted on his ARV drugs, due to stigma and fear of being known to be HIV positive. The CHW then took it upon himself, in conjunction with the CHEW to collect drugs from the health facility for the individual.

In some cases, the CHEWs or CHWs took on other community roles outside of their jurisdiction e.g. a youth discussant said

There was also a case where dogs were eating people's sheep. The CHW was not able to do much but reported to the CHEW who worked with the government veterinary department to poison the dogs"

Education was cited as a positive (45%) and of no consequence at all (41%) while 14% said their academic qualifications negatively affected their performance. Religion did not influence at all the performance of 67% of the CHEWs while 27% felt it positively impacted on their performance with 6% claiming it was an impediment to their performance. Experience and knowledge/skills 75% and 69% positively affected their performance respectively while 63% acknowledged self-motivation positively affected their performance.

Perceived support factors that influence performance

Many 42% of CHEWs received financial support for their services with 95% from partners and 20% from MOH. However, only 6% were of the opinion that the financial support they received was adequate for their work. Activities that were financially supported; 38% dialogue day meetings, 18% action day meetings, 40% monthly meetings and 2% supervisory visits..

Perceived legislative factors that influence performance

Only 8% of CHEWs knew institution that accredits their training, 91% of those who didn't know said they wished to be accredited. Ninety four percent (94%) of the respondents said they had been certified as CHEWs. Similarly, 94% of the respondents said they had been trained in community strategy and almost all (95%) who had received this training (community strategy) affirmed that it had improved their performance. Over half (56%) of the respondents were aware of a CHS policy in Kenya and listed the following policies: payment of CHWs-20%, scheme of service (18%), community communication strategy (22%), M&E framework (12%), curriculum guideline (34%) and Training of trainers (TOT) training guideline (36%).

Perceived community factors influencing performance

Over half (54%) of the respondents felt that their gender did not affect their work in any way while 28% and 18% said gender positively and negatively affected their performance respectively. Forty four percent (44%) of the CHEWs reported that cultural practices in the communities they worked did not affect their work while 26% and 30% intimated that such practices positively and negatively affected their work performance.

The results showed that socio-economic factors had the most negative impact on the CHEW performances with: food security (10%) not at all, 24% positively and 66% negatively; income levels-4% not at all, 20% positively and 76% negatively; occupation-31% not at all, 14% positively and 55% negatively; and literacy levels (20%) not at all, 12% positively and 68% negatively. They also cited infrastructure especially roads as the other an additional factor that negatively (68%) impacted on their work. Majority (78%) of the interviewees had existing partnerships between them and other members or institutions. The 3 most important of the partnership to the respondents were collaborations/networking/linkages (67%), capacity building (54%) and logistics support (48%).

IV. DISCUSSION

Health Facility-community linkages

The continuum of linkage between the facility and the community in by the CHEWs, for provision of extension services to the communities and referral was found to be weak and learning from what has worked in Malawi is critical. In Malawi, Health Surveillance Assistants HSAs, formerly recruited as temporary 'Smallpox Vaccinators' in the 1960s and as 'Cholera Assistants' in mid 1970s have contributed greatly to the delivery of preventive health services in rural areas of Malawi. Over time, they have formed an extensive network of ground staff linking the formal health services and the community. They are responsible for about 60% of all vaccination that are given to under five children in the rural areas. Their contribution has enabled the country to virtually eliminate and/or reduce prevalence rates of the highly infectious but preventable diseases namely: measles, polio, diptheria, pertusis, smallpox and tetanus. They also play a very significant role in detecting disease outbreaks and in providing assistance to the victims Kadzandira [2].

In the words of Habtamu Argaw [3], reviews of the 1st Health Sector Development Plan (1997/98-2001/02) indicated the challenges in achieving universal coverage of PHC and revealed that necessary basic health services have not reached the people at the grass roots level as envisaged and desired, due to the nature of services being given by the health system. In response to this the government has introduced an innovative program called Health Extension Program (HEP) and this started implementation during the 2nd Health Sector Development Plan (HSDP) (2002/03 - 2004/05). Accelerated Expansion of Primary Health Services strategy has also been planned as part of facilitating the achievement of universal coverage of PHC. It's this programme that introduced Health extension workers (HEW) who are trained for a year at Technical and Vocational Training and Education Centers (TVET). This program is similar to community strategy and performance of CHEWs which is to invigorate PHC in improving the community health system such duration of training is currently being worked to ensures that CHEWs are trained and become professional in their line of duties as other cadres in the health care provision in the country

Findings showed mixed referral linkages among the different sites with urban slums recording very poor referral linkages and peri-urban settings reporting very strong linkages whilst the nomadic and agrarian scored below average referral linkages. However, all the CHEWs have been provided with standard referral forms for use. In their review of community health agents' performance in Brazil Guanais & Macinko [4] also conclude that the referral system in place was not fully utilized and postulate that the continuum of care and referral are vital especially through structured and clear procedures for referral and counter-referral between facilities and CHWs, as well as follow up by CHWs with household visits and patients seeking care and support. There is a strong community-health facility linkage which have resulted in enhanced community awareness/ knowledge and health education; increased demand for health services. However, most CHEWs did not conduct the whole continuum of HF-community linkage

Role of CHEWs in maternal, child and general household health

One of the best ways to measure the performance of CHEWs is by measuring the health outcomes at the household level. Such health outcome indicators could be based on maternal and child health as well as the general health knowledge, practice and health seeking behaviour. Findings showed that CHEWs and CHWs have continuously engaged in a wide spectrum of health issues for both communicable and non-communicable diseases.

In their study to measure the performance of community health workers under integrated community case management of childhood illnesses in eastern Uganda, Kalyango [5] concluded that CHWs providing dual-illness management performed reasonably well and that with appropriate customized training, adequate supervision, and provision of drugs and necessary supplies, CHWs can provide integrated treatment and other services to community households. This integrated approach was found to be more effective in dealing with both minor and major health needs and concerns within the community.

Within the survey sites, due to the continued integrated approach (both curative and preventive) of health workers (both CHEWs and CHWs), the overall health of infants/ babies within the community units surveyed can be said to have improved due to consistent positive messaging and good health practices like

exclusive breastfeeding, uptake of ANC and PNC services which ensure growth monitoring, immunization and health advice to mothers. Skilled deliveries have also been enhanced which by extension reduce maternal and neonatal mortality and morbidity. Overall, with the guidance of the CHEWs and CHWs, community members (especially women) have developed good health-seeking behavior in preventive (immunization and hygiene) and promotive (nutrition and family planning) health and subsequently reduce the burden of diseases. Where curative measures are required, CHEWs and CHWs have identified health needs of individuals and addressed them effectively.

Supportive supervision and capacity building support to CHWs and CHCs

Results showed that CHEWs have continued to offer CHWs on the job training in different health indicators like maternal and child health, behavior change communication, family planning among others. These in-service trainings help CHWs by refreshing their already acquired knowledge needed to deliver quality services. In their review of strategies for improving performance of health care service providers, Rowe et al [6], say that formal training, offered to CHWs either at the initial pre-service education or during continuing in-service, has a demonstrably positive effect on CHW performance and conclude that the better trained a CHW is, the more empowered they are to deliver health care within their community. They further postulate that, even though less studied, informal training through on-the-job peer networks also plays an important role in a health worker's knowledge base. Such informal trainings can include; lessons learned on the job, peer-to-peer knowledge transfer and informal links to mentors and medical professionals.

The study showed that the CHEWs were involved in an integrated approach to delivering both preventive and (where feasible) curative services to the community households (while simultaneously supporting and coaching the CHWs). The findings indicate that most CHEWs have effectively managed to deliver on both approaches. Nomadic sites appeared to be performing much better that the other sites. Possible explanation for this could be due to the fact that access to health care services in the nomadic sites is much more difficult considering all factors comprehensively such as transport, distance, security and other societal related issues.

For CHEWs to be able to make an effective contribution, they must be carefully selected, appropriately trained and supervised and very importantly adequately and continuously supported. Pre-service and even in-service training has to be supplemented with mentoring and supervision that help make the training stick and that help adapt it to local circumstances. CHEWs need supervisors who can answer their questions and help them solve problems that usually arise during service delivery. Moreover, good supervision is essential to facilitating the psychosocial support systems that help community health workers to survive the stresses and strains that arise when providing services to desperately ill and dying people. To provide such support, supervision capacity has to be built, credited and rewarded.

Community based health information systems

Since CHEWs provide extended health services to the community and its households, there is an opportunity for strengthened data collection through household screening visits or activity reporting that can generate vital information like: registration of vital events such as recent births and deaths (including verbal autopsies to determine cause of death), burden of diseases such as acute malnutrition or malaria, and coverage levels of essential interventions such as immunizations, pregnancy care and skilled delivery of newborns among others.

Results showed adequate, albeit not 100%, availability of national data collection tools to both the CHWs and the CHEWs. The CHEWs also have rated the performance of CHWs on data quality related dimensions of timeliness, accuracy, consistency, completeness and integrity. The overall rating of CHWs from agrarian site show timeliness and data integrity as lacking, peri-urban only having a poor rating for accuracy while nomadic and urban slums' CHW performance in data quality rated as below average in all the 5 data quality dimensions. While the agrarian and peri-urban sites need to be supported to sustain and improve on their data management processes, it is vital to establish why the other two settings performed dismally with almost similar staff.

Dissemination of collated information by CHWs was also well conducted at either the dialogue or action days. Data collected from the households was also aggregated and reported vertically (both upwards into the national process and downwards into community forums). The findings showed that CHEWs have been instrumental in supporting informed decisions at the community level through collection, collation, analysis/ interpretation and dissemination of crucial health-related information with other health agencies and partners. Accurate data is needed for effective monitoring of community health indicators. This data is also consumed at the national level and helps in the development of relevant policy.

Perceived factors that influence chew performance

The performance of CHEWs is affected by both extrinsic and intrinsic factor. In their cross-sectional survey of CHWs to examine the factors that motivated the performance India's Accredited Social Health Activist (ASHA) programme, Gopalan et al [7], say that the desire to gain social recognition, a sense of social responsibility and self-efficacy motivated played a crucial role in CHW motivation. Studies conducted in several settings indicate that keen attention to tier (national, community and individual) factors by policy makers leads to improved productivity and retention of CHWs in their work stations. Bhattacharyya et al [8] say that successful CHW programs depend on a framework of incentives at the individual, community, and health system levels that collectively motivate individuals to become CHWs and continue in this capacity, as well as motivate communities or policy makers to maintain and support CHWs.

Perceived support factors and CHEW performance

The study established CHEWs rate the performance of the government in providing support towards their tasks as well below their expectations. On the contrary, they feel partners have been more proactive in providing logistic and other technical support necessary for their optimal performance. There was a disconnect between the CHEW and DHMT, partners and Health Facility Management Committee expectations. With the low rating, it is apparently clear that they would want more financial support towards meeting their transportation communication and other logistically related-costs. There is definite need to address issues around transport, reimbursement and communication of CHEWs while remaining alive to the sustainability components especially within the resource-constrained government environment similarly, in qualitative data showed DHMT neither provided transport nor refunds for the same whilst partners such as Aphia plus Kamili project made transport refunds during dialogue and action days.

Strengths/ Weaknesses,

The study provides the first empirical evidence of performance of CHEWs in different socio-cultural and demographic regions bringing together PHT/PHO, ECN and ESP CHEWs. The weakness of the study was to directly link the performance of CHEWs to household health outcomes as only the CHWs work directly with CHWs. Further, perceived rather than factors that actually influenced performances were measured in the study

V. Conclusions

Reorganization of CHEWs by the community is critical in improving their duties well defined and monitored, age-specific are adopted for wider coverage and service delivery, and workload is monitored to ensure optimal productivity and continuum of linkage for all inclusive provision of health care services.

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Competing interests

There is no conflict of interests among any of the authors

Authors' contributions

James Mwrigi Mwitari was is the principal investigator and provided guidance and policy direction for the study
John Ouma Odondi was Co- principal investigator for the study and provided guidance and policy direction to the team
Makiko Kinoshita was responsible for the operation direction of the study and linked JiCA, MOH Kenya and reviewed the study instruments
Kenneth Ngari Ogendo was the focal person for research linking the Ministry with the project team in terms field organization and logistics
Salmon Ogutu Owii was responsible for the study design, field data collection and data management and write up the study proposal and manuscript.
Erick Auko Oyugi was the data manager and supported in the quantitative data analysis.
Dan Owino Kaseje provided technical back stopping for the study from the Kenyan context

Yasuhiko Kamiya provided technical support in the tools development, review of protocol and study designs.

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FIGURES AND TABLES

Figure 1: CHEW performance in community linkages

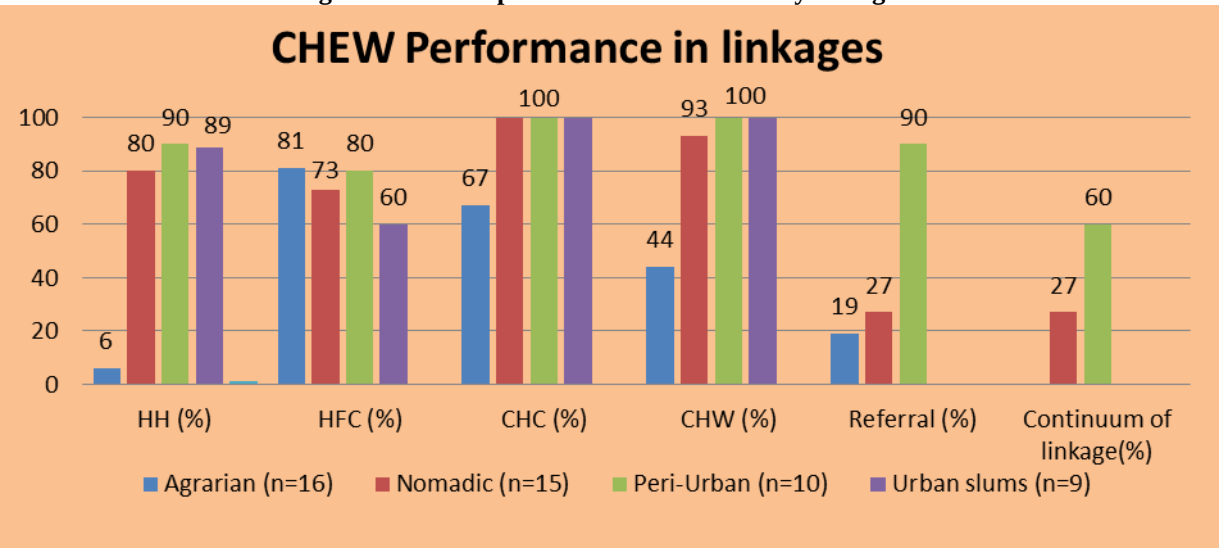

Table 1: Association between cadre and ANC visits

		No. of ANC visits			
Site	Cadre	≥ 4	<4	OR	95% CI
Agrarian	Nurses/PHO/PHT	60	51	0.99	0.646-1.518
	ESP	191	164		
Nomadic	Nurses/PHO/PHT	20	17	1.119	0.557-2.248
	ESP	129	98		
Peri-urban	Nurses/PHO/PHT	102	52	0.86	0.426-1.737
	ESP	27	16		
Urban slums	Nurses/PHO/PHT	0	0	-	-
	ESP	234	104		

Table 2: Association between cadre and place of delivery

		Place of delivery			
		HF	Others	OR	95% CI
Agrarian	Nurses/PHO/PHT	89	22		
	ESP	306	48	1.576	0.903-2.751
Nomadic	Nurses/PHO/PHT	21	16		
	ESP	77	150	0.391	0.193-0.792
Peri-urban	Nurses/PHO/PHT	114	40		
	ESP	31	12	0.906	0.425-1.933
Urban slums	Nurses/PHO/PHT	0	0		
	ESP	268	70	-	-

Table 3: Association between cadre and uptake of family planning

		Use of any FP method			
		Yes	No	OR	95% CI
Agrarian	Nurses/PHO/PHT	88	23		
	ESP	274	82	0.873	0.519-1.471
Nomadic	Nurses/PHO/PHT	26	11		
	ESP	108	122	0.375	0.177-0.794
Peri-urban	Nurses/PHO/PHT	108	46		
	ESP	27	16	0.719	0.354-1.459
Urban slums	Nurses/PHO/PHT	0	0		
	ESP	229	110	-	-

Table 4: Association between cadre and exclusive breastfeeding

		Exclusive breastfeeding			
		Yes	No	OR	95% CI
Agrarian	Nurses/PHO/PHT	16	69		
	ESP	81	226	1.546	0.848-2.817
Nomadic	Nurses/PHO/PHT	15	20		
	ESP	86	108	1.062	0.513-2.196
Peri-urban	Nurses/PHO/PHT	14	118		
	ESP	5	34	1.24	0.418-3.687
Urban slums	Nurses/PHO/PHT	0	0		
	ESP	78	226	-	-

Figure 2: Rating of logistical support to CHEWs

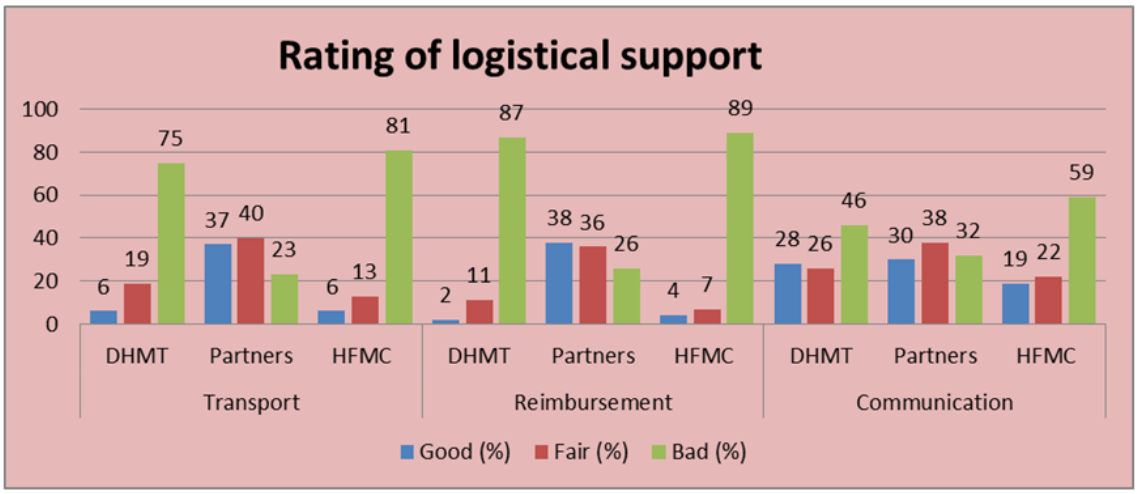

Table 5: Activities by CHEWs during home visits and what they discussed

Activities by CHEWs during home visits	Agrarian (n=16)		Nomadic (n=15)		Peri-urban (n=10)		Urban (n=9)		Totals	
	n	%	n	%	n	%	n	%	n	%
Health education	10	62.5	14	93.3	9	90	9	100	42	84
Return demonstration	9	56.3	10	66.7	8	80	7	77.7	34	68
Counseling	4	25	10	66.7	8	80	7	77.7	29	58
Medical treatment	4	25	3	20	5	50	1	11.1	13	26
Topics discussed during home visits	Agrarian (n=16)		Nomadic (n=15)		Peri-urban (n=10)		Urban (n=9)			
	n	%	n	%	n	%	n	%	n	%
Maternal health	5	31.3	13	86.7	5	50	7	77.7	30	60
Breast feeding	3	18.8	14	93.3	8	80	7	77.7	32	64
Immunization	3	18.8	12	80	8	80	7	77.7	30	60
Water and sanitation	2	12.5	0	0	1	10	1	11.1	4	8
Nutrition	3	18.8	14	93.3	6	60	8	88.9	31	62

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