Zawolo *et al.*
Health Research Policy and Systems (2024) 22:141
https://doi.org/10.1186/s12961-024-01211-w

Health Research Policy and Systems

RESEARCH

Open Access

Transition and change: opportunities and challenges of CHW programme reform for community health systems and vertical disease programmes in Liberia

Georgina Zawolo[1], Gertrude Nsorma Nyaaba[2*], Gartee Nallo[3], Karsor Kollie[4], Rachael Thomson[5], Joanna Raven[6], Sally Theobald[6] and Laura Dean[6*]

Abstract

Background Globally, community health worker (CHW) programmes are critical to addressing health worker shortages and have been recognised as critical pillars within the drive towards universal health coverage (UHC). In 2016, the Liberian Ministry of Health launched the National Community Health Services Policy 2016–2021, which included significant CHW programme reform to address ongoing health workforce capacity gaps in the country. However, little consideration was given to the impact of such reforms on ongoing health interventions that rely heavily on the use of CHW cadres. Our study explores how CHW programme reform in Liberia influenced performance of CHWs involved in the delivery of Neglected Tropical Disease (NTD) programmes to elucidate how health systems reform can impact the delivery of routine health interventions and vice versa.

Methods We used a qualitative case study approach conducted between March 2017 and August 2018. Our instrumental case study approach uses qualitative methods, including document review of five CHW and NTD program-related policy documents; 25 key informant interviews with facility, county, and national level decision-makers; and 42 life and job histories with CHWs in Liberia. Data were analysed using a thematic framework approach, guided by Kok et al. framework of CHW performance. Data were coded in QRS NVIVO 11 Pro.

Results Our findings show that CHW programme reform provides opportunities and challenges for supporting enhanced CHW performance. In relation to health system hardware, we found that CHW programme reform provides better opportunities for: formal recognition of CHWs; strengthening capacity for effective healthcare delivery at the community level through improved and formalised training; a more formal supervision structure; and provision of monthly incentives of 70 US dollars. Efficiency gaps in routine intervention delivery can be mitigated through the strengthening of these hardware components. Conversely, supervision deficits in routine CHW functioning can be supported through health interventions. In relation to systems software, we emphasise the ongoing importance of community engagement in CHW selection that is responsive to gendered power hierarchies and accompanied by gendered transformative approaches to improving literacy.

*Correspondence:
Gertrude Nsorma Nyaaba
Gertrude.Nyaaba@lstmed.ac.uk; ngertrude@gmail.com
Laura Dean
laura.dean@lstmed.ac.uk
Full list of author information is available at the end of the article

Conclusions This study shows how CHW programme reform provides opportunities and challenges for health system strengthening that can both positively and negatively impact the functioning of routine health interventions. By working together, CHW programmes and routine health interventions have the opportunity to leverage mutually beneficial support for CHWs, which can enhance overall systems functioning by enhancing CHW performance.

Keywords Community health workers, Neglected tropical diseases, Liberia

Background

Health workforce deficiencies remain a critical public health challenge, particularly in low- and middle-income countries (LMICs) [1, 2]. In Africa, there are an estimated 2.5 health workers per 1000 population, which is critically below the WHO recommended Sustainable Development Goal (SDG) density threshold of 4.45 per 1000 population [3–5]. High rates of health worker attrition often lead to inequitable healthcare access, particularly in rural, remote and hard-to-reach areas, where health workforce densities are generally lower than national averages [1, 2, 6]. Community health workers (CHWs) have become a globally utilized strategy to address health workforce capacity gaps [7–9]. Consequently, over the last 20 years, CHW programmes have been re-invigorated and recognized as critical pillars within the drive towards universal health coverage (UHC) [2–4, 10, 11].

The term CHW is often used as a blanket term to refer to several categories of frontline health workers and/or volunteers with different duties [9]. CHWs provide health promotion services for communicable and non-communicable diseases (NCDs), and deliver preventive and first-line curative services in communities [12–14], usually following basic training at point of recruitment. Evidence shows that when adequately supported, CHWs contribute to improving maternal and child health (MCH), sexual and reproductive health (SRH) and other health outcomes [15, 16]. Thus, ensuring CHWs are adequately supported and motivated becomes essential to the delivery of crucial community-based health services [17–20]. [20] Despite CHW's critical interface role between communities and health systems, they are often hindered by multiple policy and operational challenges, including minimal training, inadequate logistics and supplies, poor or limited remuneration and inadequate supportive supervision [7].

Community health systems reform in Liberia

In Liberia, the health system is recovering from prolonged conflict and humanitarian crisis, with access to healthcare hindered by insufficient infrastructure and lack of appropriately qualified health personnel [21–23]. Liberia's national health workforce density is less than 3.7 per 10,000 population [24], and more than 29% of Liberians live more than an hour walking distance from the nearest health facility [22, 25]. Consequently, CHWs are often the only regular point of contact with the health system. During the Ebola epidemic (2014/2015), CHWs were fundamental in engaging and supporting communities to respond and control the epidemic, showcasing the critical role CHWs play within Liberia's health system [26–28]. As a result, following the Ebola outbreak, the Liberian government (in collaboration with partners) prioritized the development, finalization and rollout of an integrated CHW programme as part of generalized health systems reform. In 2016, the Liberian Ministry of Health (LMoH) launched the Revised National Community Health Services Policy 2016–2021 (NCHSP) and its associated strategic plan. The NCHSP contained the revised CHW programme aim "to strengthen the health system and promote trust and ownership of health interventions to ensure adequate health and social protection for all" [23]. The associated strategic plan provided guidance and instructions for core operating structures for managing and supporting CHWs, prioritizing the introduction of a paid (70 US dollars per month) cadre of CHWs titled community health assistants (CHAs), who would supervise an unpaid cadre of CHWs entitled community health volunteers (CHVs) (Fig. 1). CHVs would receive 5 US dollars per day they are involved in health campaign activities. CHAs are supervised by trained and paid community health service supervisors (CHSS), who are in turn supervised by officers in charge (OIC) at the nearest health facility [23, 25]. The revision and roll out of the NCHSP 2016–2021 and associated strategic plan are thought to have had significant impacts on Liberia's community health system and presented new operating structures for associated health interventions.

Neglected tropical diseases and community health systems

Neglected tropical diseases (NTDs) are a group of 20 infectious diseases of poverty known to impact some of the world's poorest and most marginalized populations [29]. NTDs amenable to preventive chemotherapy (PC NTDs) through mass drug administration (MDA) (including lymphatic filariasis, onchocerciasis and soil transmitted helminths) have largely been the focus of elimination and control efforts, including in Liberia [29]. MDA campaigns rely on the use of non-salaried or

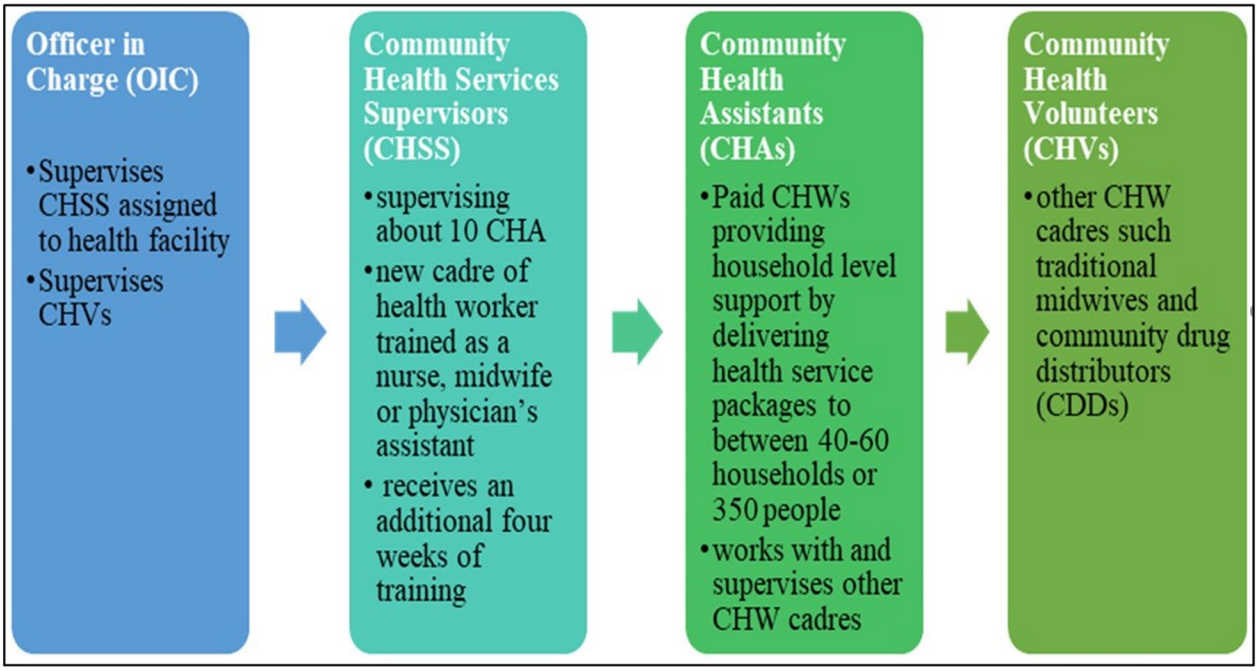

Fig. 1 Summary of operating procedures of the revised CHW programme

volunteer CHWs, termed community drug distributors (CDDs), to deliver medicines to communities through a house-to-house distribution strategy [30]. The control and elimination of PC NTDs through high MDA coverage rates have widely been described as a "litmus test" for UHC due to the necessity for exemplary community engagement to ensure access and acceptance of medicines [29]. Historically, communities have been encouraged to remunerate CDDs for their time and service to the community, with national programmes providing transportation reimbursement [29]. However, in Liberia, the roll out of the NCHSP 2016–2021 emphasized that all health campaigns, including MDA, must now operate through routine community health programme structures, adhering to associated remuneration guidelines. Thus, understanding the influence of CHW programme reform on routine NTD programme activities (MDA) is key to elucidating broader impacts on progress towards UHC.

Study purpose and conceptual framing

Our study explores how CHW programme reform in Liberia influenced the performance of CHAs and CHVs involved in the delivery of MDA. We use this case study to elucidate how health systems reform can impact the delivery of routine health interventions to help/hinder progress towards UHC. Our study is guided by key elements of Kok et al.'s conceptual framework on CHW performance [19] (Fig. 2). Kok et al. recognize CHW performance as dynamic and influenced by transactional social processes that are shaped by multiple interconnecting factors, including: (1) the context in which the system or intervention is located; (2) health systems hardware, including available human resources, information systems etc.; and (3) health systems software that is concerned with the social processes and values that influence healthcare delivery [19, 20]. Health interventions, often delivered through vertical programmes, for example MDA, operate within this environment, bringing with them additional hardware and software that further influence CHW performance. This framework becomes apt in considering how a health policy change (such as CHW programme reform in Liberia) influences health system functioning through impacts on hardware (training, supervision, logistics and supplies and remuneration/incentives) and software (feelings surrounding selection and recruitment and community relations, power structures and responses) to influence CHW performance within a given intervention.

Methods

We used a qualitative case study approach conducted between March 2017 and August 2018 to understand how CHW programme reform influenced the delivery of a vertical health intervention (MDA) in Liberia. Our instrumental case study approach is designed to facilitate thinking in health systems community around how community health programme reform can influence

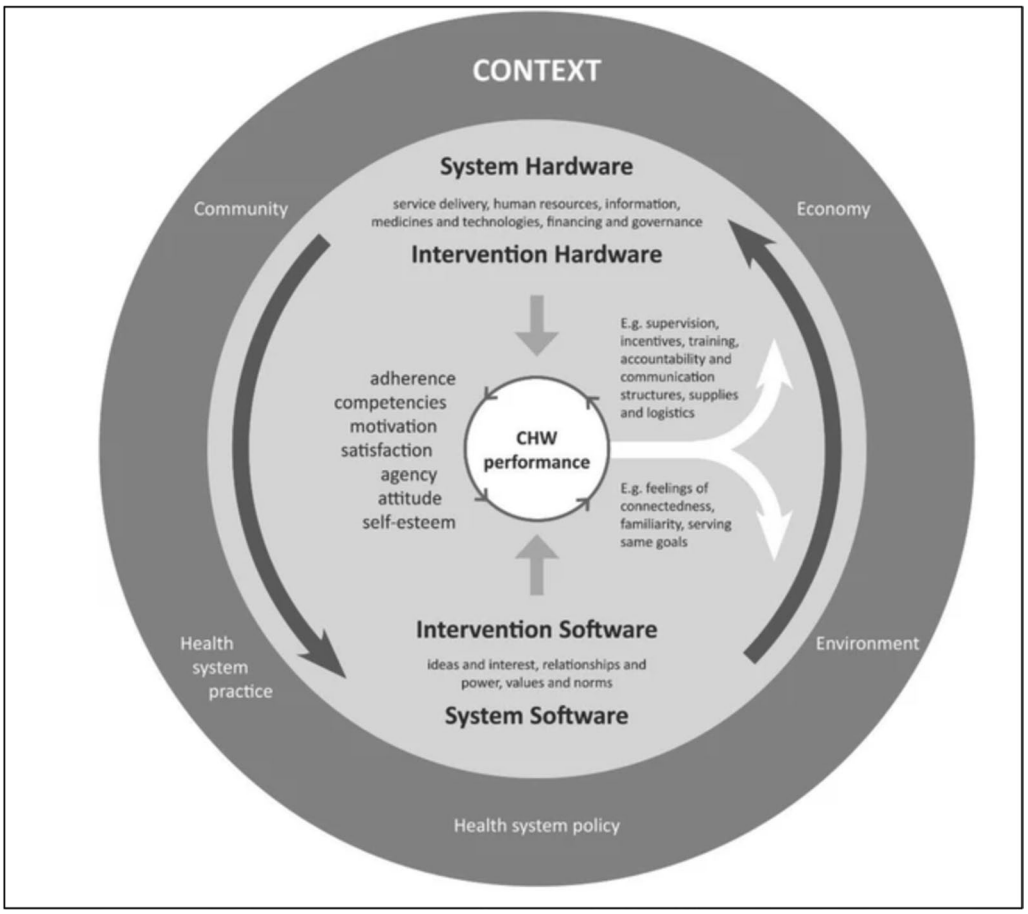

Fig. 2 Kok et al. conceptual framework of community health worker performance within adaptive health systems

routine health intervention delivery as opposed to being "typical of other cases" [31, 32]. Our study follows the consolidated criteria for reporting qualitative research (COREQ) (Supplementary file 1) [33], to explore a single phenomenon (CHW policy and programme reform) within a real-life context (Liberia).

Study locations and sampling

The study was conducted at the national, county and district levels in Liberia. At the county level, Maryland, Bong and Grand Bassa counties were purposively selected for data collection as they included districts that received partner support (mostly funding) for implementing the revised CHW policy and those that relied solely on government support.

Data collection

We conducted a document review and key informant interviews with purposively selected stakeholders at the national level to gain insights into CHW policy and programme reform. At the county level, we conducted key informant interviews (KIIs) with decision-makers and managers within the county team and selected health facilities. At the community level we conducted life and job histories with CHAs/CHVs (previously CDDs) involved in MDA. All qualitative data were collected by five research assistants (RAs). RAs had at least 3 years of contextual research experience in Liberia. Data collection was informed by pre-designed topic guides which had been piloted and modified prior to data collection. All interviews were conducted face to face in English and Kpelle, Bassa or Grebo (local dialects). Interview date, time and location was determined by the participant(s) following an initial meeting to explain the study purpose. Verbal and/or written/thumb-printed informed consent was sought from each participant in the presence of a witness. Interviews lasted between 30 min and 65 min. The first author held daily debriefing sessions with RAs to discuss key findings and refine lines of inquiry towards achieving data saturation, that is, where no new ideas were emerging from the data [34]. No identified

participant declined participation and no interviews were repeated. All audio files (67 total) were transcribed verbatim in English by five [5] RAs and reviewed by the first author for quality assurance. Accuracy of translations was assessed by listening to audio files and conducting concurrent back translation.

Document review: We (L.D., G.Z., G.N., J.R.) completed a content analysis of policy documents to understand: (1) the actors and processes driving the policy; (2) cadres of CHWs referred to and their selection criteria; (3) how CHWs are managed, supported and remunerated; (4) integration of CHWs within the health system; and (5) any barriers and facilitators to programme or policy implementation. Table 1 presents the five policy documents selected for review, identified by key informants as the key guiding documents of the CHW programme reform and/or influencing the delivery of MDA.

Key informant interviews: Results from the document review informed topic guides to explore participants' perceptions and experiences of how CHW policies are implemented and managed, their influence on health interventions and the day-to-day implications on CHWs in terms of training, supervision, motivation and remuneration. Key informants were purposively selected on the basis of their knowledge and experience of the community health programmes at the national, county and district levels. A total of 25 key informant interviews were conducted with representatives of the Liberian MoH [4], NTD programme [5], the community health programme [1], non-governmental organization (NGO) programme implementing partners [5], OICs of health facilities [6] and CHSS [4].

Life and job histories: To gain phenomenological insights regarding the experience of CDDs, 42 life and job histories were conducted with purposively selected CHAs/CHVs (previously CDDs) in Maryland and Bong counties. Life and job histories allowed us to explore and document their life and job experiences, including changes over time. CHAs/CHVs (previously CDDs) were recruited on the basis of the length of time engaged with the NTD programme (participated in at least two MDA campaigns), gender and age. Some participants had been trained as CHAs and thus are expected to benefit from associated remuneration, others had not and so remained classified as CHVs. CHAs/CHVs (previously CDDs) narrated their life and career history detailing motivation, training, supervision and involvement in MDA activities. We also asked CHAs/CHVs (previously CDDs) to describe their perceptions of CHW programme reform.

Data analysis

A thematic framework approach was used in data analysis [35, 36] and informed by Kok et al.'s conceptual framework of CHW performance (Fig. 2). The initial coding framework generated in QRS NVivo 11 pro by LD, GZ, JR, ST, GN was derived from pre-identified themes within the topic guide and conceptual framework [37]. Using both deductive and open-ended inductive approaches, transcripts were coded in constant comparison and patterns and linkages between quotes, codes, themes and existing literature were explored in-depth for contextual relevance, convergence and divergence. Data from the document review and interviews are triangulated and synthesized in the results section, with the document review providing a situational context for the qualitative findings.

Ethics

Ethical approval was obtained from the University of Liberia Pacific Institute for Research and Evaluation UL-PIRE IRB (16-09 009) and Liverpool School of Tropical Medicine (LSTM) (17-044), while administrative consent was obtained from the Liberian MoH prior to data collection.

Results

Table 2 presents participant characteristics while Table 3 presents additional key illustrative quotes from study transcripts which demonstrate the authenticity of the findings.

Guided by Kok et al.'s conceptual framework on CHW performance, the results are presented under three main themes: the context of the CHA policy and its influence on NTD programme delivery; hardware-related factors; and software-related factors.

Table 1 Policies accessed and reviewed

Author	Policy document	Date
Ministry of Health, Monrovia, Liberia	National Community Health Services Policy (NCHSP)	2016–2021
	National Community Health Services Strategic Plan	
	Investment Plan for Building a Resilient Health System in Liberia	2015–2021
	National Health and Social Welfare Policy and Plan	2011–2021
	Master plan for Neglected Tropical Diseases	2016–2020

Table 2 Characteristics of interviewed participants

Label	Label description		Gender Male (M), female (F)	Educational level	Number of persons interviewed
A. Key informant interviews (KIIs)					Total (25)
MKII 001–006	Health Ministry Montserrado co		M (4), F (2)	Further education	6
HKII-001–004	Officer in charge (OIC)		M (2), F (3)	Further education	4
SVKII-001	Sightsavers		M (1)	Further education	1
PIHKII-001	Partner in health		M (1)	Further education	1
LMHKII-001	Last mile health		M (1)	Further education	1
NTDKII-001	NTD program		M (1)	Further education	1
BKII-001–002	Health facility		M (2)	Further education	2
DKII- 001	Community health director		M (1)	Further education	1
CHOKII -001	County health officer		M (1)	Further education	1
CHSSKIIs- 001–004	Community health service supervisor		M (4)	Further education	4
DHOKII -001–02	District health officer		M (2)	Further education	2
B. CDD life and job histories					Total (42)
HLJH-001 -019	CDD interviews	County (Maryland)	M (10), F (9)	Attended secondary school – further education	19
BLJH-001 -023		County (Bong)	M (20), F (3)	Attended primary school – further education	23

The context of the CHA policy and its influence on NTD programme delivery

The document review shows that the revised policy is centred around the CHSS and CHAs who are formally recognized and "paid" community health cadres. Informal or volunteer CHWs are categorized as community health volunteers (CHVs). Table 4 presents the types of CHWs operating in Liberia, their key roles and responsibilities and the training required under the revised NCHSP. Key informant interviews show that high-level political will and mobilization, evidence from other CHW policy reforms in African countries, such as Ethiopia, and the drive to achieve UHC were key factors shaping CHW programme reform.

> *"[the] president saw value in the policy and was a driving force" (County MoH staff, male)*
> *"Focus on UHC and ensuring equitable access to health services for all Liberians was important for pushing this agenda forward" (National MoH staff, male).*

Hardware-related factors

The revised CHW policy provides several opportunities and challenges for the training, supervision, remuneration and provision of logistics and supplies for CHWs. Ultimately, CHW programme reform had the potential to enable inequities between the newly created CHW cadres, influencing motivation and performance, including attitudes towards the delivery of MDA.

Training

The document review identified pre- and in-service training requirements for CHAs, CHSS and CHVs (Table 4), emphasizing the need for coordination with the Ministry of Education (MoE) to embed community health content into existing pre-service training programmes. Additionally, the potential for accreditation of the CHA programme was documented. In-service training was anticipated to take place through bi-annual trainings, focussed supportive supervision and/or linked to periodic interventions for the various cadres of CHWs, with the latter being less detailed. For CHAs, the review shows that any training provided by NGOs and national- and county-level health staff should be aligned to four key modules that cover essential health topics (including NTDs). CHA training should be delivered over 4 months as a hybrid of classroom and practical community-oriented activities. Most key informants described CHA training positively, describing it as didactic training with supervised role-plays that CHAs are expected to complete. However, KIIs from study sites that did not receive partner support for implementing the revised CHW policy reported CHA training as ad hoc and only provided linked to vertical programmes or interventions. They

Table 3 Participant quotes from transcripts

Theme	Quotes
The context of the CHA policy and its influence on NTD programme delivery	"[the] president saw value in the policy and was a driving force" (County MoH staff, male)
	"[it is] influenced by the policy in other countries such as Ethiopia" (County MoH staff, male)
	"Focus on UHC and ensuring equitable access to health services for all Liberians was important for pushing this agenda forward" (National MoH staff, male)
Hardware	
Training	"There is no training besides the monthly meeting we don't have any extra training that have been provided. I remember we had the NTD where they were train how to distribute the Mectizan, but since that time we have had no additional training" (OIC, male, unsupported district)
	"I want them to give us some materials like training book or something that we will be reading through" (CDD, male, Bong)
	"It can be short…because those drugs you are carrying in the community… The mistake you make maybe the life you were saving, you will be damaging…the time frame of training is too short. At least they could make it two day, three days…the third day where they can test you whether you understand it or you don't understand it, they ask few questions that you will not [be] able to make a mistake in the field if you do go" (CDD, female, Maryland)
Supervision	"In the policy it says that CHSS will visit the CHA twice a month. The reality is that some of them have not been able to reach to the CHA to supervise them even once a month. This is because the CHSS must work 20% of their time in the clinic, but the clinic work takes up most of their time. So, we would like them to be assigned to the facility as the community health team, but not have to work in the facility" (NGO national level, male)
	"I have to walk seven hours distance to go for supervision, and then I have to supervise the CHAs on two hours. Before I come back, darkness will catch me, and I will sleep there" (CHSS, supported district, female)
	"The county health team supposed to check on us…Nothing for me nobody can check me check on me. So, myself too I say…It is better for me to pick up cutlass and go on my farm" (CDD, male, Maryland)
	"the government [needs] to think about how the structures can be sustained…those that are working need some form of motivation either cash or kind" (DHO, unsupported district, male)
	"[Quality assurance officer] provides a layer of supervision between the OIC and the CHSS" (NGO national level, male)
Remuneration	"They should be given some cash at the end of every month…They will also be feeling good because that's a form of employment too. Imagine you are in the village and every month you get seventy dollars, which amount to almost ten thousand dollars you know in Liberian Dollars…but for the past three months you know their incentives have not been delivered. There's bureaucracy you know, the money have to go from X to the Ministry Of Health and the office of financial management rather they have their own procedure or processes before that is completed several months have elapsed and people had not gotten their pay. They still pay the people every month, but it appears like they are paying them every quarter" (NGO staff, national level, male)
	"When I took over, the CHVs weren't really working or all together, so when I took over, I brought them all together more. I didn't give them any reward, but the means…when a programme came, I didn't just let one keep working and working I started to rotate them when different programmes came and that allowed them to re-engage. The problem is that X was giving incentives but when X left you know right now is not available. So that is one thing that holds them back" (OIC, male, unsupported district)
Supplies and equipment	"We have challenges with movement and logistical support. We need something like rain gears [raincoats and other rain protective materials], we don't have it, rain boot, we don't have even the gasoline that we need to ride to get behind them sometimes it is not there. Sometimes we sacrifice and use our own money to support them" (DHO, male, unsupported district)
	"You people were not able to provide us with anything that will protect us. Such as raincoat, rain boots, because we walk in the darkness. when we go into the community, they believe that you people can bring big, big car so when you go in the community when you tell the people I am coming they can say I come give medicine so your feed me, the people cannot agree. They can say they give us money, whereby we sacrifice our lives, to serve the community because we want to prevent sickness from our community, and that is sacrifice" (CDD, male, Bong)
Software	
Selection and recruitment	"CHAs will be selected by their own people. Criteria is set, they select them…The only thing is we guide the process, we go to the community, and we talk to the opinion leader, and they select based on our criteria. If these people are interview and tested, that's how it is. We don't select but we only guide the process" (County MoH staff, male)
	"Most people in the community are not lettered. So hard to find women who are lettered" (CHSS, supported district, female)
	"in the interior…boys' education is prioritized over girls, with girls remaining in the kitchen" (CHSS, supported district)
	"Where women and youth have been unable to read and write they have been encouraged to join the elders educational programme so that they can be incorporated into the programme" (MoH, supported district, male)
	"some women who as a result [of literacy support linked to the CHA programme] have completed school and are in midwifery school right now" (CHSS, supported district, female)

Table 4 Types of CHWs operating in Liberia, their key roles and responsibilities and training required or provided

Type of community provider	Role	Household coverage			Pre-service training requirement in the NCHSP	Training package
(a) Community health assistant (CHA)	■ Supervised to deliver an integrated and standardized service delivery package that includes preventive, curative, promotive, rehabilitative and palliative services, and epidemic surveillance to households located more than 1-h walk (> 5 km) from the nearest health facility	■ One CHA 40–60 households (up to 350 population) NB: in areas that are sparsely populated (more than 1 h between communities) or			■ Must be nominated by their communities through the CHCs using established criteria ■ All selected CHAs must undergo the standardized training	■ Integrated and standardized training package including promotive, preventive and curative services as well as modules on logistics, monitoring and surveillance ■ In-service refresher training to be provided twice per year
	■ Coordinate CHVs who do not meet CHA criteria or who are not selected as CHAs	Have a population of less than 350, one CHA will be aimed for per community	Package and pass proficiency tests and supervision to progress to the next training module and function as a CHA			
(b) Community health services supervisor (CHSS)	■ Provide field-based supervision to CHAs working in remote catchment communities of the health facility	■ One CHSS to supervise 10 CHAs	■ Must be a professional health worker (registered nurse, physician's assistant, environmental	health technician)	■ Specialized training package on supply, operations, monitoring and supervisory functions ■ Also, sessions on facilitation skills and relevant technical Content for CHA level service provision as CHSS will serve as a trainer for CHAs	
(c) Community health volunteer	■ Primarily engaged in health promotion activities		■ One CHV 40–60 households (up to 350 population)		■ Training on principles of community engagement and mobilization, health promotion and education, referral ■ Specialized programmes will use standardized training modules in the area of focus with coordination with	
(d) General community health volunteer ■ *Trained traditional midwives (TTM)* ■ *Traditional midwives (TMs)* ■ *-Community/household health promoters (HHPs)* ■ *Community drug distributor (CDD)* ■ *Mass drug distributor (MDD)*	■ Provide limited promotive, preventive and curative services					

Table 4 (continued)

Type of community provider	Role	Household coverage	Pre-service training requirement in the NCHSP	Training package
■ *Community-directed care provider* ■ *Community-based distributors* ■ *Community accompaniers [one accompanier per 6–10 patients (not population-based)]* ■ *Natural leaders for CLTS* ■ *Youth peer educators*			Relevant MoH divisions	

*All data in this table are taken from the National Community Health Services Policy and Strategic plan unless otherwise stipulated

indicated that this led to some CHVs, who had not been selected for further training as CHAs, feeling excluded and poorly motivated. Some KIIs added that in areas that relied on partner support [funding] for implementing the revised CHW policy, some CHVs who had been recruited for training as CHAs where unable to complete the CHA training because partner supported ceased.

For the NTD program, training for MDA campaigns are usually cascaded to CHAs/CHVs (previously CDDs) using a train-the-trainer model. Key informants reported that health-system-related barriers influenced training of CHAs/CHVs (previously CDDs) and adversely impacted their motivation and performance. They explained that although training for OICs is delivered by county health teams (CHTs) over an expected and scheduled 3-day period, in reality, training for OICs is frequently conducted in a day and a half to: accommodate health staff workloads; minimize subsistence costs; prevent delays in drug delivery to health facilities to accommodate for rapid MDA campaign rollout to avoid drug expiration; and to meet tight reporting deadlines for the MDA campaign. These factors also led to condensed training periods for CHAs/CHVs (previously CDDs) being dissatisfied with their training, contributing to poor motivation and reduced performance. CDDs confirmed this and reported that training was usually rushed, lasting for half a day at most, and focussed on reviewing eligibility criteria and giving medicines for the MDA campaign. CHVs (previously CDDs) held the view that more training and provision of training manuals and information, education, and communication (IEC) materials on side effects of MDA medications would build their capacity and improve their performance. In contrast, CDDs who had been recruited and trained within the CHA program reported an in-depth NTD focus which provided them with critical skills to undertake MDA activities and address community concerns regarding side effects from MDA medication. This suggests that some barriers faced by vertical programme/health interventions can be alleviated through integrated health systems reform, and in this case related to enhanced training quality.

Supervision

Figure 1 provides a description of the cascade of supervision as outlined in the NCHSP. The document review reflects that supportive supervision should rely on integrated and standardized supervisory checklists and tools which are monitored by the Community Health Services Division. Regardless of implementing partner funding support or campaign activity, all key informants cited inadequate health resources that were impeding supervision. Challenges included insufficient provision and fuelling of motorbikes to transport supervisors to the various communities; and a shortage of health workers at all levels of the health system rendering high workloads that impeded capacity to provide supportive supervision. In districts without partner funding support, key informants reported that OICs are charged with providing supervision to CHVs. However, OICs highlighted how insufficient resources to undertake supervision was a key challenge, and that it was only during health campaigns (such as MDAs) that they received additional resources [e.g. fuel for motorbikes or scratch cards to call CHVs/CHAs (previously CDDs)] to enable them to complete supervision. CHVs/CHAs (previously CDDs) reported that the number of times they received supervision varied particularly during MDA campaigns, with some indicating that they received at least two supervision visits during the MDA campaigns. Other CHVs/CHAs (previously CDDs) reported that although they might receive some supervision during MDA campaigns, the timing and frequency are not pre-determined. Several CHVs stated that supervision ceased when campaigns ended, which they felt was demotivating as they were not engaged in other health activities.

In contrast, in partner-supported districts, CHAs reported feeling satisfied and supported in their activities due to the regular supportive supervision they received from CHSS under the revised CHW policy. However, CHSS and other key informants added that heavy workloads of OICs and CHSS, and large catchment areas assigned to each CHSS for supervision activities, were key barriers to effective supervision of some CHAs in some hard-to-reach areas. Additionally, several OICs and CHSS reported incurring personal out-of-pocket costs to extend supportive supervision to CHVs. In some communities, where there were no health facilities, there was no CHSS to supervise CHAs, and occasionally CHSS from neighbouring communities were assigned supervision responsibilities, further increasing their workload.

While CHVs/CHAs (previously CDDs) requested regular and structured supervision, they also proposed that phone-based supervision and regular health-facility-based meetings could alleviate some supervision challenges. Some key informants suggested the establishment of a new cadre of CHWs to play an intermediary supervisory role between OICs and CHSS. This recommendation had been piloted by one NGO partner, with the cadre being called a quality assurance officer. Key informants also added that CHA training in districts with implementation support motivated CHAs to provide peer supervision to each other. They reported that although there are sustainability challenges, the utilization of existing community structures in supervision activities, such

as community health development committees (CHDC) and health facility development committees (HFDC), had proven valuable.

Remuneration

The document review shows a clear distinction between incentives, motivation, performance-based incentives, career development and retention for CHWs. The NCHSP policy stipulates that a standardized incentive of 70 US dollars per month should be provided to CHAs who should provide at least 4 h of routine community healthcare packages at the household level per day. Key informants reported that this monthly incentive for CHAs had been introduced in partner-supported districts, and was the only financial remuneration provided for CHAs. However, county and district level key informants reported that this financial remuneration was often delayed and only provided on a quarterly basis. The reasoning for these delays was twofold: (1) due to inadequate financial resources and (2) due to bureaucracy between donors and the Ministry of Health, which had led to delays in disbursements of funds.

The NCHSP also provides for all community health cadres to receive other forms of motivation (financial or in-kind) from health programmes/interventions or communities as opportunities for receiving rewards for working on project-specific initiatives, using the following criteria for standardizing such rewards:

- Daily disbursement fees of 5 US dollars per day, not exceeding 10 days per month.
- For programmes requiring ongoing engagement of community cadres, a flat rate of up to 50 US dollars per month (commensurate to work) should be provided or compensation at rates established before 2015 but not exceeding rates received by CHAs.

The irregular or ad hoc disbursement of financial remuneration for CHAs and CHVs was described by key informants as demotivating and resulting in attrition of CHAs and CHVs. In districts without partner funding support, key informants reported that the lack of regular financial remuneration for CHVs within programme-specific initiatives was influenced by the unavailability of government funding and constrained by donor stipulations. CHV dissatisfaction with accessing such financial rewards is aggravated by the fact that some donors who had previously paid their monthly allowances had stopped because their projects ended in the district. More specifically, CHAs and CHVs (previously CDDs) expressed dissatisfaction with irregular financial remuneration received and explained that communities that previously provided some support to them had stopped because they perceived they were now adequately remunerated by the NTD programme and/or health system. Economic difficulties experienced by households also contributed to communities' inability to sustain efforts/actions to continue motivating CHVs. CHVs also expressed dissatisfaction with the fact that some of their colleagues had been selected for CHA training while they were not selected for the CHA program.

Some facility-level key informants explained that they communicated regularly with CHVs to keep them motivated and rotated which CHVs had the opportunity to engage in various one-off vertical health interventions that came with financial remuneration. A key informant reiterated the need for some remuneration for CHVs as "they were leaving things they normally do" to voluntarily support health service provision in their communities. Particularly for male CHVs who volunteered with the NTD programme, they reportedly faced criticism from family members who felt that they received financial remuneration from the NTD programme but were not bringing the money home. Finally, the NCHSP proposes the development of performance-based financing practices and career development and retention opportunities for all cadres of CHWs. Performance-based financing should be provided in collaboration with other ministries, but national-level key informants reported this was not operational, partly due to the infancy of the policy.

Supplies and equipment

The NCHSP outlines the key steps (Box 1) that the Community Health Services Division and the MoH are expected to undertake to ensure adequate and quality-assured medicines, supplies and logistics for CHWs. In practice, key informants indicate that implementation challenges in managing and coordinating the logistics and supply chain has had adverse implications on CHWs' motivation. For the NTD programme, in districts where the revised CHW policy implementation is not supported by funding partners, inadequate logistics and personal protective clothing were reported as factors affecting CHAs/CHVs (previously CDDs) performance and completion of job roles. CHAs/CHVs (previously CDDs) suggested that they should be provided with identification badges to further authenticate them in the communities as well as mobile phone calling cards to facilitate communication with supervisors. Some CHVs added that since they work in places that "they just could not reach by foot", they should be provided with motorbikes to facilitate their travel. Some county- and district-level key informants mentioned that inadequate supply of

fuel meant that even when supplies and logistics are available for distribution, they incurred personal out-of-pocket costs to transport them to CHAs/CHVs. Both KIIs and CHAs/CHVs recommended improving logistics, supply and equipment to improve intervention coverage.

Partner-supported districts also reported inadequate supply of logistics and equipment. Key informants reported that although CHAs and CHVs have been supplied with logistics such as rain boots, they still lacked supplies such as hand sanitizer, books and pens. They added that the provision of such supplies, including the issuing of certificates for CHAs and or CHVs, would be crucial to motivating and improving CHA performance.

Box 1: logistical and supply chain management stipulations in NCHSP

MoH Community Health Services Division shall:	• Ensure that national supply chain and commodity documents are reflective of the latest international guidelines and protocols for community health programs and similarly that curriculum and SOPs for CHAs are aligned national protocols; • Ensure that all key pharmaceutical policy documents incorporate CHA supply chain requirements; • Ensure that all materials intended to facilitate CHA activities are delivered to CHAs through a clearly defined framework within the health facility; • Work closely with the Supply Chain Management Unit (SCMU) to ensure medicines, medical supplies and other logistic needs or CHAs are adequately quantified at the national level on the basis of county needs and are supplied to health facilities in a timely manner to prevent stock-outs at community level • Ensure that oversight responsibilities for rational utilization are clearly delineated to the responsible pharmaceutical arm of the MoH and in coordination with county-level administration

Software-related factors

Our findings show how contextual factors, including personal relationships within communities, influence the way in which CHW programme reform is being implemented, for example, in relation to the selection and recruitment of CHWs.

Selection and recruitment

The document review shows that CHSS are selected through a formal application and interview process and should have previously been formally trained as nurses or midwives. The NCHSP also highlights the importance of county-level community health focal points in supporting the selection and replacement of CHAs alongside communities, who should be highly engaged in supporting CHA work. Consequently, communities should be guided by community health focal points to select CHAs on the basis of the core competency criteria outlined in Box 2.

Box 2: CHA selection criteria (excerpt from NCHSP p. 9)

- Must be a permanent resident in the community in which s/he serves;
- Must be between 18 and 50 years of age;
- Should be trustworthy and respected;
- Should be interested in health and development matters;
- Should be a good mobilizer and communicator;
- Should be available to perform CHA tasks;
- Should be physically, medically, mentally and socially fit to provide the required services, including walking long distances up to 1 h or more to provide health services to people in their designated catchment area;
- Should have been involved in community project/s in the past;
- Should be able to demonstrate the ability to read, write, add, subtract and multiply in English to successfully complete a test of literacy as part of their recruitment process;
- Fluency in the dialect that is spoken in the village or town where s/he is serving;
- Must be a Liberian; and
- Female participants should be given preference

County key informants described their roles in CHA selection as facilitative, explaining that OICs played a more direct role in supporting communities to select CHAs. Communities commonly propose previous CHVs for CHA roles. Key informants commonly reported the willingness of community members to volunteer for CHA training but their inability to meet the selection criteria often hindered their recruitment. For example, CHVs have to complete a literacy test before embarking on the CHA training programme. Thus, poor literacy levels in communities were a significant barrier to the selection of CHVs for CHA training irrespective of gender. However, literacy levels amongst women were described as lower due to educational preferences favouring males. Consequently, most CHAs are often selected from outside the community to ensure necessary literacy requirements.

Historically, there has been no prioritization of specific population groups within CHW selection processes, with community selection of CHAs/CHVs (previously CDDs) often being influenced by underlying community power dynamics such as affiliation with the clinic or community leaders. Over time, the study findings show that CHA/CHV (previously CDD) attrition had led to a decline in community participatory approaches to selection, with replacements often being selected by OICs or community leaders, with minimal community participation. Key informants reported that the prioritization of female participants for selection within the NCHSP could support establishing a more balanced health workforce. While the NCHSP shows an awareness of gender-based challenges in the recruitment of female participants as CHWs, it proposes engagement with the MoE to narrow gender gaps in terms of literacy access and retention. Some key informants recommended working with women (and youth) to improve their literacy levels through community-based adult education programmes to enable them to participate in the CHA program. They proposed that embedding literacy programmes within CHA training or creating educational scholarship programmes would better support the participation of women.

Community relationships and responses

Both the review and the interviews across all levels emphasized the importance of embedding CHWs within their communities, which allows them to "add respect and rapport" between the health system and communities while "educating community dwellers to make decisions about their own health". Embeddedness within communities would allow CHWs to support health surveillance activities which key informants reported as needed "in case there are outbreaks and there needs to be a focus in a specific area". Specifically, for the NTD programme, delays within the drug supply chain result in limited time to sensitize and create awareness for MDA distribution activities, which hinders community connectedness and CHA/CHV (previously CDDs) interaction with community members for successful MDA campaigns. Some CHA/CHV (previously CDDs) described community members as refusing to accept medicines or negative interactions because of the limited time they have to sensitize and connect with community members as demotivating factors. They requested support from the CHA programme in completing awareness activities and using strategies such as group sensitization meetings and involving community leaders to enhance their work.

Discussion

The drive towards attaining SDG 3 and the emergence of epidemics and pandemics such as Ebola and coronavirus disease 2019 (COVID-19) have emphasized the need to strengthen health systems. CHWs are key to strengthening community health systems and attracting increasing interest, investment and policy reforms from governments and regional and international donors. While the renewed resurgence and re-invigoration of CHW cadres provides an effective strategy for strengthening comprehensive and people-centred primary healthcare, several policy and implementation challenges exist [10, 12, 38]. Utilizing Kok et al.'s [19] conceptual framework on CHW performance (Fig. 1), we explored how CHW programme reform can impact the delivery of health interventions/vertical programming through a case study of the NTD programme in Liberia. We have adapted Kok et al.'s framework to summarize our learnings in Fig. 3.

Our findings show that CHW programme reform provides opportunities and challenges for supporting enhanced CHW performance, and ultimately the delivery of person-centred care through stronger health systems on the pathway to UHC in Liberia. In relation to health system hardware, we found that CHW programme reform provides better opportunities for formal recognition of CHAs/CHVs; strengthening capacity for effective healthcare delivery at the community level through improved and formalized training including the use of practical exercises; a more formal supervision structure where the CHSS directly supervise the CHAs; and monthly incentives of 70 US dollars for CHAs. These serve as strong motivational factors for CHAs and potentially other CHW cadres who aspire to be selected and trained as CHAs. Yet, we also found that CHW programme reform can create inequities between CHAs and CHVs, unless key hardware elements such as improved training, supervision and formalized incentives can be extended to all cadres.

Evidence from different African contexts shows that adequate training, regular and routine salary or financial remuneration, materials and tools to perform their duties are key motivational factors for CHWs [18, 39, 40]. Training as a comprehensive and dynamic hardware component should be perceived as ongoing and iterative, as its absence potentially compromises CHW performance and the quality of services they deliver. For example, multiple strengths were identified concerning the CHA training due to the training delivery approach (use of combined didactic, role play and practical activity) and duration which have been introduced as part of the revised CHW policy and programme, thus strengthening

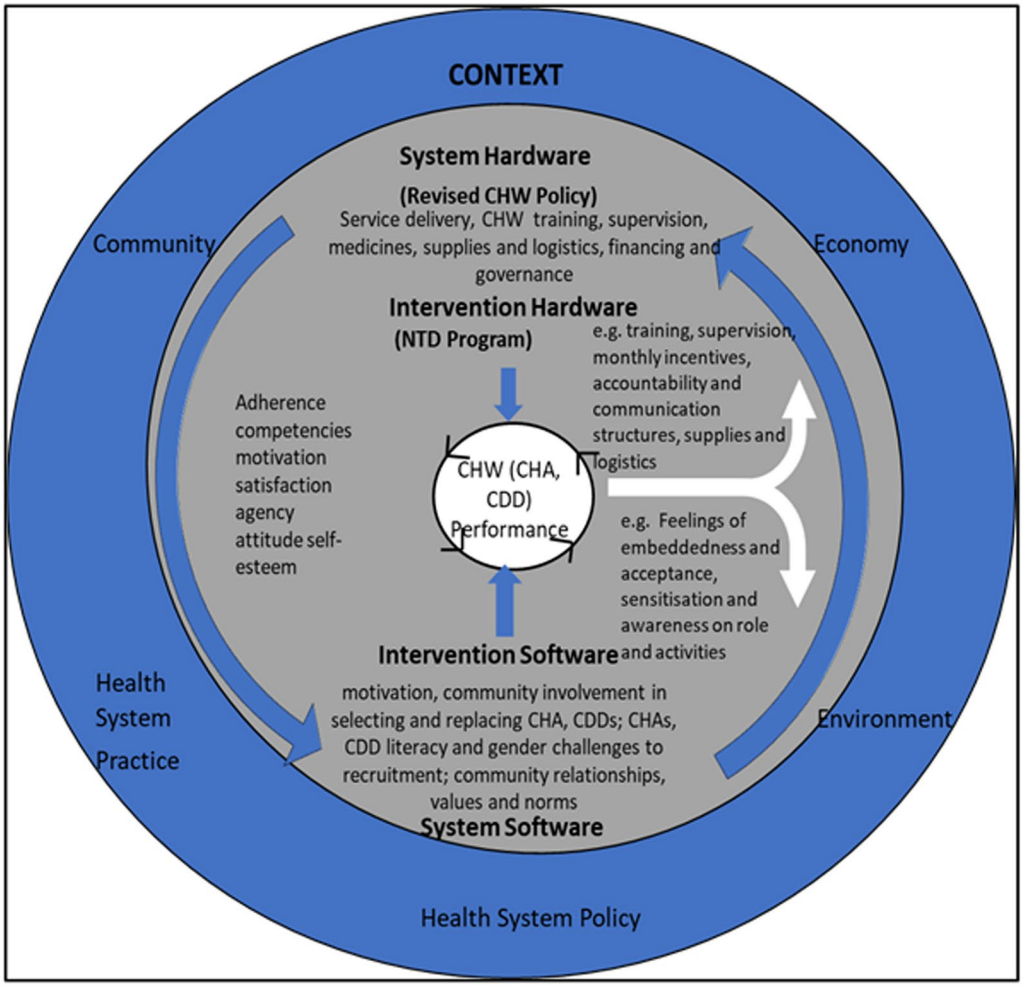

Fig. 3 Kok et al.'s conceptual framework of community health worker performance adapted to show the impact of CHW programme reform on systems and intervention functioning

systems hardware. These contributions to stronger systems hardware have also become essential in supporting the address of intervention deficits. For example, the NTD program, weaknesses in CHV (previously CDD) training for MDA remained, which were in part mitigated by enhanced routine training content. However, in districts and counties where the implementation of the revised CHW programme is not supported by partner funding, systems and intervention weaknesses remain and are more apparent, resulting in condensed training periods for CHVs (previously CDDs) and inadequate logistical support, rendering demotivated CHVs. Thus, care should be taken to ensure that all cadres of CHWs, irrespective of geographical location, benefit from the leveraging of stronger systems hardware to fulfil intervention training gaps. Without such considerations, differences in capacity development opportunities could facilitate the perception of inequity among CHW cadres not for selected for training and engagement under the CHA programme, leading to demotivation and attrition of CHVs.

Donor funding stipulations further shape training delivery and who receives what, further facilitating perceived inequities among the various cadres of CHWs. The CHA training under the revised CHW programme is mainly funded by international donors, which not only poses a challenge to its implementation in districts and countries where donors are absent, but also in questioning the sustainability of the CHA program in the absence of donor funding support to the government. In areas where the implementation of the revised CHW policy was not supported by donors, only a few CHVs (previously CDDs) were selected and trained as CHAs. Consequently, CHVs (previously CDDs) not selected were left feeling discouraged and demotivated, which further adversely affects the delivery of NTD programming

through MDA campaigns. In instances where donors departed from districts or counties during the implementation of the revised CHW policy, CHA training of selected CHVs was disrupted and/or halted. Conversely, in areas lacking donor support, intervention training challenges may be exacerbated, with negative impacts on CHV performance due to their non-selection and engagement in the CHA programme. This shows that where the implementation of the CHA programme under the revised CHW policy is rolled out, it has to be backed by adequate partner support to enable it address CHW training gaps. Health policy-makers and implementers therefore need to institute key strategies that address funding for the CHA program as part of the implementation of the revised CHW policy and its structures.

Supportive supervision is an essential element to the success of any intervention/programme [41]. However, our findings show that supportive supervision remains one of the weakest areas of the implementation of the CHA programme and other associated health interventions, including MDA. Challenges in the delivery of supportive supervision were identified as similar to those in other settings, including inadequate numbers of health staff, staff workloads and inadequate resources allocated to supervision [40]. Supportive supervision needs focussed improvement to support enhanced effectiveness of both routine and intervention-based care delivery [42]. For the CHA program, although the formalized CHSS and CHA supervision structures provides opportunities for improving supervision of other cadres of CHWs working in vertical programs such as CHVs (previously CDDs), the limited numbers of CHSS remain a critical barrier to improved supervision, resulting in irregularity and poor-quality supervision. For instance, consistent with other studies reporting the frequency ranges of supervision visits from zero to once a year and to three times a month [43, 44], CHVs (previously CDDs) were infrequently supervised during MDA campaigns, with little or no supervision received once the campaigns are concluded. The situation is worsened by inadequate resource support for supervision, propelling supervisors to spend out of pocket to undertake supervision reported in this and other studies [40, 41, 44–46]. Peer and electronic supervision accompanied with adequate communication routes and resources have been recommended as alternative ways to reduce supervision challenges related to costs, gender issues and professional development [47–50]. High-performing peers could potentially progress into the CHA program, as career advancement opportunities would provide a strong motivation for other cadres of CHWs to improve their performance. Other studies have suggested expanding the role of community actors to include supporting supervision [51, 52]. Findings in this study show village health committees (VHCs) and CHDCs could also serve as community actors, providing CHVs with supportive supervision.

Our findings show that inequities are created by the establishment of remuneration structures that do not include all cadres of CHWs. These inequities are further complicated by poor donor coordination and inconsistencies in payments of CHA remuneration. Even where CHW remuneration policies recommended by WHO and other studies are in place [53], these are not adhered to, further worsening inequities between CHWs. As such, while CHW programme reform provides systems hardware opportunities for CHAs to receive a monthly remuneration of 70 US dollars, delays in payments arising from irregular disbursement of funds and bureaucracies persist, which demotivate CHAs and other CHW cadres. CHVs who remain de-incentivized are further demotivated by these perceived inequities, which potentially influence their performance, particularly where intervention or campaign-based activities struggle to support a daily fee for engagement as recommended in the revised CHW programme. Differences in remuneration packages between MoH programmes and NGO-sponsored vertical programmes further entrench inequities in African settings [54]. Compounding their dissatisfaction is the limited numbers of volunteers to work as CHVs (previously CDDs) due to comparatively less incentives, creating high workloads on inadequate numbers of CHVs (CDDs) participating in MDA campaigns. Donor and government commitment and regular disbursement of financial remuneration programs for all CHWs cadres are urgently needed to facilitate the effective implementation of the revised CHW policy to achieve sustained health gains. However, as only 2.5% of total official development assistance for health has targeted CHW programmes, with about two-thirds of this being allocated for vertical disease control programmes over the last decade [55], lobbying for adequate financial inputs to CHW programmes needs increased attention and investment.

Irregular supplies and materials as well as poor logistics hinder the activities of CHW cadres, adversely affecting their performance both at the system and intervention levels. The revised CHW programme in Liberia presents opportunities for enhanced coordination and collaboration with vertical disease programmes for strengthening health systems and supporting intervention delivery built around the efficient use of shared resources. However, challenges surrounding the management of partners' interests and restricted funding continue to influence resource allocation in this regard [56]. If used appropriately, vertical programme or intervention funding (e.g. MDA campaign funding) has the potential to address system hardware funding gaps through the sharing of

resources to improve supervision and or logistical support (e.g. protective clothing) to the CHAs/CHVs.

In relation to systems software, the revised CHW programme provides an avenue to enhance community delivery and acceptance of CHWs through an increase in the recruitment, training and engagement of CHAs, including an emphasis on recruiting women. Evidence shows female CHAs could improve coverage for health interventions in communities [57], yet our findings align with others that emphasize literacy challenges hinder female recruitment as CHAs in Africa [40]. Community-based adult education programs could support the inclusion of women as CHVs and subsequently as CHAs. Specifically, for NTD programming, encouraging girl child educational programs could improve numbers of female CHVs (previously CDDs), supporting the enhancement of programme coverage as well [29].

Adaptations that promote gender transformation require long-term change, and significant structural adaptations including addressing power dynamics at the community level are also required to support such efforts. For example, as found here and in other studies in LMICs [58], the decline in community participation in the selection and replacement of CHAs/CHVs creates challenges in ensuring community ownership and support of community health cadres and ultimately impacts the sustainability of community-led approaches. The need for community involvement and transparency in the selecting and replacement of CHAs/CHVs cannot be underestimated, and a reflection on power and participation in the process is critical.

Our study has highlighted how transition and change in national policy and programme strategy can directly influence the lived experience of community health cadres at the interface of service delivery. Our use of life and job histories enabled critical temporal analysis of experience both pre- and post-programme reform. However, we were unable to recruit high numbers of female CHAs/CHVs to our study, largely due to their absence from fulfilling these job roles, meaning that we may have not understood the full range of gendered experiences that CHAs/CHVs experience. We also did not complete life and job histories in Grand Bassa, resulting in an absence of CHW experience from this geographic setting. Additionally, in some counties, we also struggled to recruit CHSS for interviews, as they had not yet taken up their posts, and thus their views and experiences are sometimes absent within the presentation of our data. Despite these challenges, we believe that we have captured a wide diversity of responses through in-depth case study design, which have been triangulated with document-based data. Similar views and experiences were also noted across other geographies, indicating similarities in experience. We have also validated our study findings through county and national dissemination meetings with representatives from across the country.

Conclusions

This study used a case-study approach to explore how CHW programme reform in Liberia influenced the training, motivation, performance and supervision of CHAs and CHVs involved in the delivery of MDA. We use this case study to elucidate how health systems reform can impact the delivery of routine health interventions. Through the application of Kok et al.'s framework for CHW performance, we considered how health systems reform and ongoing routine health interventions can support each other to enable systems strengthening in relation to both systems hardware and software. The hardware dimension shows opportunities and challenges linked to training, motivation, supervision and logistics and supplies, whilst the software dimensions highlight the importance of community engagement and participation in CHW programming. The study provides evidence of how system and intervention hardware and software dimensions need to be leveraged collectively to address gaps and challenges to improve CHW motivation and competencies towards better healthcare delivery and building stronger and more resilient health systems.

Abbreviations

CHW	Community-based health worker
CDDs	Community drug distributors
CHAs	Community health assistants
CHDC	Community health development committees
CHSS	Community health services
CHSD	Community health services division
CHTs	County health teams
CHVs	Community health volunteers
HFDC	Health facility development committees
IEC	Information, education and communication
LMoH	Liberian Ministry of Health
LMICs	Low- and middle-income countries
MCH	Maternal and child health
MoH	Ministry of Health
MDA	Mass drug administration
NCHSP	National Community Health Services Policy
NTD	Neglected tropical disease programmes
NCDs	Non-communicable diseases
SRH	Sexual and reproductive health
SDG	Sustainable Development Goal
UHC	Universal health coverage

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12961-024-01211-w.

Supplementary Material 1.

Acknowledgements
The authors thank the leaders of the study communities and the study participants for their participation. We also appreciate the CHD at the MoH for allowing access to policy documents and participants, county health teams, OICs and staff of the health facilities who assisted in the identification and recruitment of the study participants.

Author contributions
GZ, GN, KK, RT, JR, ST and LD designed the study, received funding to complete the work and supervised all activity. GZ,GN and KK led data curation activities. GZ, GN, LD, and GNN facilitated the analysis process. GZ, GNN and LD drafted the first version of the manuscript. All other authors reviewed, inputted and approved the submission.

Funding
The research project was jointly funded by COUNTDOWN (FCDO-PO6407) and ReBUILD (FCDO-PO 5247 and REDRESS (NIHR200129). The funders played no role in the design of the study and the collection, analysis and interpretation of data and in writing the manuscript.

Availability of data and materials
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the University of Liberia Pacific Institute for Research and Evaluation UL-PIRE IRB (16-09 009) and Liverpool School of Tropical Medicine (LSTM) (16-042), while administrative consent was obtained from the Liberian MoH before data collection. Verbal and/or written/thumb-printed informed consent was sought from each participant before the interview.

Consent for publication
Consent for publication was sort from each participant prior to the interview.

Competing interests
The authors declare that they have no competing interests.

Author details
[1]University of Liberia Pacific Institute for Research and Evaluation, University of Liberia, Capitol Hill, Monrovia, Liberia. [2]Department for International Public Health, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, United Kingdom. [3]University of Liberia Pacific Institute for Research and Evaluation, University of Liberia, Capitol Hill, Monrovia, Liberia. [4]Ministry of Health, Neglected Tropical Disease Programme, Monsterrado, Monrovia, Liberia. [5]Department of Tropical Disease Biology, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, United Kingdom. [6]Department of International Public Health, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, United Kingdom.

Received: 17 June 2022 Accepted: 4 August 2024
Published online: 07 October 2024

References

1. Burch V, McKinley D, Van Wyk J, Kiguli-Walube S, Cameron D, Cilliers F, et al. Career intentions of medical students trained in six sub-Saharan African countries. Educ Health. 2011;24(3):614.
2. Chen L, Evans T, Anand S, Boufford JI, Brown H, Chowdhury M, et al. Human resources for health: overcoming the crisis. Lancet. 2004;364(9449):1984–90.
3. Perry H, Zulliger R, Scott K, Javadi D, Gergen J. Case studies of large-scale community health worker programs: examples from Bangladesh, Brazil, Ethiopia, India, Iran, Nepal, and Pakistan. Afghanistan: Community-Based Health Care to the Ministry of Public Health; 2013.
4. Perry HB, Chowdhury M, Were M, LeBan K, Crigler L, Lewin S, et al. Community health workers at the dawn of a new era: 11. CHWs leading the way to "Health for All". Health Research Policy and Systems. 2021;19(3):1–21.
5. WHO. Health workforce requirements for universal health coverage and the sustainable development goals.(human resources for health observer, 17). 2016.
6. World Health O. WHO guideline on health workforce development, attraction, recruitment and retention in rural and remote areas: web annexes. Geneva: World Health Organization; 2021. p. 2021.
7. Celletti F, Wright A, Palen J, Frehywot S, Markus A, Greenberg A, et al. Can the deployment of community health workers for the delivery of HIV services represent an effective and sustainable response to health workforce shortages? Results of a multicountry study. AIDS. 2010;24:S45–57.
8. Feroz A, Jabeen R, Saleem S. Using mobile phones to improve community health workers performance in low-and-middle-income countries. BMC Public Health. 2020;20(1):1–6.
9. Scott K, Beckham S, Gross M, Pariyo G, Rao KD, Cometto G, et al. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. Hum Resour Health. 2018;16(1):1–17.
10. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. The lancet. 2007;369(9579):2121–31.
11. Schneider H, Okello D, Lehmann U. The global pendulum swing towards community health workers in low-and middle-income countries: a scoping review of trends, geographical distribution and programmatic orientations, 2005 to 2014. Hum Resour Health. 2016;14(1):1–12.
12. Chokshi DA, Cohen L. Progress in primary care—from Alma-Ata to Astana. JAMA. 2018;320(19):1965–6.
13. Hodgins S, Kok M, Musoke D, Lewin S, Crigler L, LeBan K, et al. Community health workers at the dawn of a new era: 1. Introduction: tensions confronting large-scale CHW programmes. Health Res Policy Syst. 2021;19(3):109.
14. Van Lerberghe W. The world health report 2008: primary health care: now more than ever: World Health Organization; 2008.
15. Black RE, Taylor CE, Arole S, Bang A, Bhutta ZA, Chowdhury AMR, et al. Comprehensive review of the evidence regarding the effectiveness of community–based primary health care in improving maternal, neonatal and child health: 8. Summary and recommendations of the expert panel. J Glob Health. 2017. https://doi.org/10.7189/jogh.07.010908.
16. Rieger M, Wagner N, Mebratie A, Alemu G, Bedi A. The impact of the Ethiopian health extension program and health development army on maternal mortality: a synthetic control approach. Soc Sci Med. 2019;232:374–81.
17. Boerma T, Requejo J, Victora CG, Amouzou A, George A, Agyepong I, et al. Countdown to 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health. The Lancet. 2018;391(10129):1538–48.
18. Jigssa HA, Desta BF, Tilahun HA, McCutcheon J, Berman P. Factors contributing to motivation of volunteer community health workers in Ethiopia: the case of four woredas (districts) in Oromia and Tigray regions. Hum Resour Health. 2018;16(1):1–11.
19. Kok MC, Broerse JEW, Theobald S, Ormel H, Dieleman M, Taegtmeyer M. Performance of community health workers: situating their intermediary position within complex adaptive health systems. Hum Resour Health. 2017;15(1):59.
20. Kok MC, Kane SS, Tulloch O, Ormel H, Theobald S, Dieleman M, et al. How does context influence performance of community health workers in low-and middle-income countries? Evidence from the literature. Health Res Policy Syst. 2015;13(1):1–14.
21. Ghobarah HA, Huth P, Russett B. The post-war public health effects of civil conflict. Soc Sci Med. 2004;59(4):869–84.
22. Ministry of Health L. National Community Health Services Policy- Revised December 2015. 2015.
23. Ministry of Health M, Liberia. Revised national community health services policy 2016–2021. 2015.
24. Organization WH. World health statistics 2015: World Health Organization; 2015.
25. Rogers J, Napier H, Raghavan M. Liberia's National Community Health Worker Programs. Health for the People: National Community Health Worker Programs from Afghanistan to Zimbabwe. 2020:189.

26. Ballard M, Bancroft E, Nesbit J, Johnson A, Holeman I, Foth J, et al. Prioritising the role of community health workers in the COVID-19 response. BMJ Glob Health. 2020;5(6): e002550.
27. Healey J, Wiah SO, Horace JM, Majekodunmi DB, Duokie DS. Liberia's community health assistant program: scale, quality, and resilience. Glob Health Sci Pract. 2021;9(Supplement 1):S18–24.
28. World Health A. Community health workers delivering primary health care: opportunities and challenges. Geneva: World Health Organization; 2019.
29. Dean L, Ozano K, Adekeye O, Dixon R, Fung EG, Gyapong M, et al. Neglected Tropical Diseases as a 'litmus test'for Universal Health Coverage? Understanding who is left behind and why in Mass Drug Administration: lessons from four country contexts. PLoS Negl Trop Dis. 2019;13(11): e0007847.
30. Macfarlane CL, Dean L, Thomson R, Garner P. Community drug distributors for mass drug administration in neglected tropical disease programmes: systematic review and analysis of policy documents. J Glob Health. 2019. https://doi.org/10.7189/jogh.09.020414.
31. Stake R. Case study research: Springer; 1995.
32. Yin RK. Case study research: Design and methods. Sage; 2009.
33. Britten N. Qualitative research: qualitative interviews in medical research. BMJ. 1995;311(6999):251–3.
34. Bowen GA. Naturalistic inquiry and the saturation concept: a research note. Qual Res. 2008;8(1):137–52.
35. Ritchie J, Lewis J, Nicholls C, Ormston R. The foundations of qualitative research. Qual Res Pract A Guid Soc Sci students Res. 2003:2–10.
36. Ritchie J, Lewis J, Nicholls CM, Ormston R. Qualitative research practice: A guide for social science students and researchers, Sage; 2013.
37. Saldaña J. The coding manual for qualitative researchers. Sage; 2021.
38. Perry HB, Chowdhury M, Were M, LeBan K, Crigler L, Lewin S, et al. Community health workers at the dawn of a new era: 11. CHWs leading the way to "Health for All." Health Res Policy Syst. 2021;19(3):111.
39. Bertone MP, Lurton G, Mutombo PB. Investigating the remuneration of health workers in the DR Congo: implications for the health workforce and the health system in a fragile setting. Health Policy Plan. 2016;31(9):1143–51.
40. Raven J, Wurie H, Idriss A, Bah AJ, Baba A, Nallo G, et al. How should community health workers in fragile contexts be supported: qualitative evidence from Sierra Leone, Liberia and Democratic Republic of Congo. Hum Resour Health. 2020;18(1):1–14.
41. Kok MC, Vallières F, Tulloch O, Kumar MB, Kea AZ, Karuga R, et al. Does supportive supervision enhance community health worker motivation? A mixed-methods study in four African countries. Health Policy Plan. 2018;33(9):988–98.
42. Tseng Y-H, Griffiths F, de Kadt J, Nxumalo N, Rwafa T, Malatji H, et al. Integrating community health workers into the formal health system to improve performance: a qualitative study on the role of on-site supervision in the South African programme. BMJ Open. 2019;9(2):e022186.
43. Bosch-Capblanch X, Marceau C. Training, supervision and quality of care in selected integrated community case management (iCCM) programmes: a scoping review of programmatic evidence. J Glob Health. 2014. https://doi.org/10.7189/jogh.04.020403.
44. Ludwick T, Turyakira E, Kyomuhangi T, Manalili K, Robinson S, Brenner JL. Supportive supervision and constructive relationships with healthcare workers support CHW performance: Use of a qualitative framework to evaluate CHW programming in Uganda. Hum Resour Health. 2018;16(1):11.
45. Crigler L, Gergen J, Perry H. Supervision of community health workers. Washington: USAID/Maternal and Child Health Integrated Program (MCHIP). 2013.
46. Schurer JM, Fowler K, Rafferty E, Masimbi O, Muhire J, Rozanski O, et al. Equity for health delivery: opportunity costs and benefits among Community Health Workers in Rwanda. PLoS ONE. 2020;15(9): e0236255.
47. Henry JV, Winters N, Lakati A, Oliver M, Geniets A, Mbae SM, et al. Enhancing the supervision of community health workers with WhatsApp mobile messaging: qualitative findings from 2 low-resource settings in Kenya. Glob Health Sci Pract. 2016;4(2):311–25.
48. Källander K, Strachan D, Soremekun S, Hill Z, Lingam R, Tibenderana J, et al. Evaluating the effect of innovative motivation and supervision approaches on community health worker performance and retention in Uganda and Mozambique: study protocol for a randomised controlled trial. Trials. 2015;16(1):1–18.
49. O'Connor EC, Hutain J, Christensen M, Kamara MS, Conteh A, Sarriot E, et al. Piloting a participatory, community-based health information system for strengthening community-based health services: findings of a cluster-randomized controlled trial in the slums of Freetown, Sierra Leone. J Glob Health. 2019. https://doi.org/10.7189/jogh.09.010418.
50. WATSEMBA A, Nakibaala G, Ssali BS, Namugera F, Katushabe P, Loiseau J, et al. An Evaluation of a Peer Supervision Pilot Project among Community Health Workers in Rural Uganda. 2020.
51. Hill Z, Dumbaugh M, Benton L, Källander K, Strachan D, Ten Asbroek A, et al. Supervising community health workers in low-income countries–a review of impact and implementation issues. Glob Health Action. 2014;7(1):24085.
52. Roberton T, Applegate J, Lefevre AE, Mosha I, Cooper CM, Silverman M, et al. Initial experiences and innovations in supervet al.ng community health workers for maternal, newborn, and child health in Morogoro region. Tanzania Hum Resour Health. 2015;13(1):1–12.
53. Colvin CJ, Hodgins S, Perry HB. Community health workers at the dawn of a new era: 8. Incentives and remuneration. Health Res Policy Syst. 2021;19(3):106.
54. Aridi JO, Chapman SA, Wagah MA, Negin J. A comparative study of an NGO-sponsored CHW programme versus a ministry of health sponsored CHW programme in rural Kenya: a process evaluation. Hum Resour Health. 2014;12(1):1–15.
55. Lu C, Palazuelos D, Luan Y, Sachs SE, Mitnick CD, Rhatigan J, et al. Development assistance for community health workers in 114 low-and middle-income countries, 2007–2017. Bull World Health Organ. 2020;98(1):30.
56. Kollie K, Siakeh A, Zawolo G, Wickenden A, Theobald S, Rogers E, et al. Donor reliance and the impact on neglected tropical disease programme delivery: reflections and solutions for change from programme management perspectives. Int Health. 2021;13(4):376–8.
57. Shoemaker EA, Dale K, Cohn DA, Kelly MP, Zoerhoff KL, Batcho WE, et al. Gender and neglected tropical disease front-line workers: Data from 16 countries. PLoS ONE. 2019;14(12): e0224925.
58. LeBan K, Kok M, Perry HB. Community health workers at the dawn of a new era: 9. CHWs' relationships with the health system and communities. Health Res Policy Syst. 2021;19(3):116.

Publisher's Note