

Does supportive supervision enhance community health worker motivation? A mixed-methods study in four African countries

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Abstract

Supportive supervision is an important element of community health worker (CHW) programmes and is believed to improve CHW motivation and performance. A group supervision intervention, which included training and mentorship of supervisors, was implemented in Ethiopia, Kenya, Malawi and Mozambique. In three of the countries, this was combined with individual and/or peer supervision. A mixed-methods implementation study was conducted to assess the effect of the supervision intervention on CHWs' perceptions of supervision and CHW motivation-related outcomes. In total, 153 in-depth interviews were conducted with CHWs, their supervisors and managers. In addition, questionnaires assessing perceived supervision and motivation-related outcomes (organizational and community commitment, job satisfaction and conscientiousness) were administered to a total of 278 CHWs pre- and post-intervention, and again after 1 year. Interview transcripts were thematically analysed using a coding framework. Changes in perceived supervision and motivation-related outcomes were assessed using Friedman's ANOVA and *post hoc* Wilcoxon signed-rank tests. Interview participants reported that the supervision intervention improved CHW motivation. In contrast, the quantitative survey found no significant changes for measures of perceived supervision and inconsistent changes in motivation-related outcomes. With regard to the process of supervision, the problem-solving focus, the sense of joint responsibilities and team work, cross-learning and skill sharing, as well as the facilitating and coaching role of the supervisor, were valued. The empowerment and participation of supervisees in decision making also emerged in the analysis, albeit to a lesser extent. Although qualitative and quantitative findings differed, which could be related to the slightly different focus of methods used and a 'ceiling effect' limiting the detection of observable differences from the survey, the study suggests that there is potential for integrating supportive group supervision models in CHW programmes. A combination of group with individual or peer supervision, preferably accompanied with methods that assess CHW performance and corresponding feedback systems, could yield improved motivation and performance.

Keywords: Community health workers, supportive supervision, motivation, performance, sub-Saharan Africa

Key Messages

- Evidence from a 1-year mixed-methods intervention study in four sub-Saharan African countries shows that supportive group supervision, when combined with individual and/or peer supervision, can improve community health worker (CHW) motivation and performance, although qualitative and quantitative findings differed.
- Supervision was perceived to be more supportive if it involved a problem-solving focus; joint responsibilities and team work; cross learning and skill sharing; the supervisor taking a facilitating and coaching role and, to a lesser extent, empowerment and participation of supervisees in decision making.
- To ensure sustained positive impacts on CHW programmes, supervision interventions need to be embedded within broader health system strengthening.

Introduction

Community health workers (CHWs) form an essential group of health workers in low- and middle-income countries, contributing to improved health of rural and poor communities (Lewin *et al.*, 2010; Perry *et al.*, 2014). Their contribution, however, is often constrained by the plurality of tasks assigned to them and the limited support, including remuneration and other incentives, they receive from the health sector and the community (Glenton *et al.*, 2013). Within available support systems, supervision is often mentioned as an important programme element to increase CHW motivation and performance (Lehmann and Sanders, 2007; Bhutta *et al.*, 2010; Palazuelos *et al.*, 2013; Kok *et al.*, 2014; Naimoli *et al.*, 2014; Ludwick *et al.*, 2018). Definitions of and approaches to implementing supervision, however, vary within the health system and across different contexts.

Generally, supervision involves processes of ‘directing and supporting staff so that they may effectively perform their duties’ (Marquez and Kean, 2002, p. 4). Although most definitions of supervision imply support, recently, more emphasis has been placed on the importance of ‘supportive supervision’ (Marquez and Kean, 2002; Bailey *et al.*, 2016). Marquez and Kean (2002) describe supportive supervision as ‘a process that promotes quality at all levels of the health system by strengthening relationships within the system, focusing on the identification and the resolution of problems and helping to optimize the allocation of resources’ (Marquez and Kean, 2002, p. 12). Here, supportive supervision is distinguished from ‘traditional’ supervision, whereby supportive supervision contains the notion of humanized support, as opposed to managerial control (Hernández *et al.*, 2014). Supportive supervision can happen in (a combination of) various forms: individual or group supervision between health worker(s) and supervisor, peer supervision and supervision through community structures; and it is often combined with other modalities, including self-assessment (Hill *et al.*, 2014).

There is evidence suggesting that supportive supervision increases health worker, including CHW, performance and quality of care (Hill *et al.*, 2014; Snowdon *et al.*, 2017). A recent systematic review on supervision in primary healthcare in sub-Saharan Africa found that supportive supervision can have a positive effect on clinical quality, efficiency, job satisfaction and motivation, when compared with traditional or no supervision. The mechanisms leading to positive effects in motivation and performance were found to be related to trusting relationships between supervisor and supervisee, including team spirit and open two-way communication (Bailey *et al.*, 2016). These findings are consistent with recent studies, which found that the intermediary position of CHWs makes trust and

relationships important determinants of performance (Ndima *et al.*, 2015; Kok *et al.*, 2017). Specifically, CHWs’ relationships with their supervisors can improve CHW performance, when trust and feelings of being supported result in improved motivation (Kok *et al.*, 2016b). In addition, supervision can provide legitimacy to CHWs in the eyes of their communities, further contributing to their motivation and performance (Kane *et al.*, 2010; Roberton *et al.*, 2015).

Although the positive effects of supportive supervision on CHW performance are widely acknowledged, higher-level impacts are challenging to prove. It is methodologically difficult to attribute improvements in health outcomes to supportive supervision, independent of other interventions or contextual changes in the health system (Marquez and Kean, 2002; Bailey *et al.*, 2016). Some recent studies have focused on how to improve supervision processes: the use of tools and guidelines, increasing supervision frequency and duration, training of supervisors (in technical and soft skills) and attention to problem solving, feedback, training, mentoring and consultation with the community can result in improved CHW motivation and performance (Hill *et al.*, 2014; Kok *et al.*, 2014, 2016b; Bailey *et al.*, 2016). Still, there remains limited evidence on how different forms of supportive supervision lead to improved motivation and performance of CHWs (Kok *et al.*, 2014).

As in many CHW programmes, a context analysis conducted in 2013 found that irregular, fault-finding supervision was one of the main de-motivating factors for CHWs in Ethiopia, Kenya, Malawi and Mozambique (Kok *et al.*, 2016b). In response, an intervention was introduced to train supervisors in supportive supervision, with the approach adapted to reflect each country’s health system context. A mixed-methods implementation study was conducted over the period of 1 year to assess whether this intervention had an effect on CHWs’ perceptions of supervision and CHW motivation; and if so, which aspects of the supervision led to this effect. These contextualized findings can provide policy makers and practitioners with insights into how supervision could be shaped to yield optimal CHW performance.

Methods

The four country contexts

This study draws on research conducted within the CHW programmes of Ethiopia, Kenya, Malawi and Mozambique. We deliberately selected four Sub-Saharan African countries with well-established CHW programmes, but with variations in the typology of CHWs and extent of their integration into the health system (Table 1).

In Ethiopia, a group of health professionals based in health centres—the command post—supervise health extension workers

Table 1. Overview of CHW programmes in Ethiopia, Kenya, Malawi and Mozambique (Kok *et al.*, 2016b)

Programme features	Ethiopia	Kenya	Malawi	Mozambique
Programme start	2004	2006	1992	1978, revitalized in 2010
Number of CHWs (2016)	38 000	18 038	9443	3041
Name of CHW	HEW	CHV	HSA	APE
Focus	General health, focus on maternal, neonatal and child health	Disease prevention and control, family health services and hygiene and environmental sanitation	Community, family, environmental health, prevention and control of communicable diseases	Child health, diagnose and treat malaria, diarrhoea, chest infections
Catchment population per CHW	2500	100	1000	5000
Sex CHW	Female (exception: male in pastoralist areas)	Female and male	Female and male	Female and male (71% male)
Selection criteria	<ul style="list-style-type: none"> • Secondary school • Living in area of service 	<ul style="list-style-type: none"> • Respected • Literate • Role model • Willingness to volunteer 	Primary school, now changing to secondary school	<ul style="list-style-type: none"> • >18 years • Respected • Literate (basic literacy and numeracy test)
Selected by	By district health office, <i>kebele</i> administrator and sometimes community committee	By community	By central government	By community with support of district health directorate
Supervised by	Health centre staff and district health office	CHEWs	Senior HSAs and (assistant) environmental health officers	Health facility staff and district health directorate
Linked to community structure	HDA	CHCs	VHCs	CHCs
Initial training	1 year	10 days	12 weeks	4 months
Salary	Yes	No, but sometimes (performance-based) monetary incentives related to a vertical programme or community-level income-generating activities	Yes	Yes, described as subsidy and currently depending upon donor support
Employed by government	Yes	No	Yes	No

CHC, community health committee; HDA, health development army; VHC, village health committee.

(HEWs); here, one health professional linked to one health post is responsible for the supervision of two HEWs (Bilal *et al.*, 2011; Kok *et al.*, 2015). At the community level, HEWs are sometimes monitored by the *kebele* (village) administration and volunteers known as ‘the health development army’ (Bilal *et al.*, 2011; Teklehaimanot and Teklehaimanot, 2013; Kok *et al.*, 2015). In Kenya, according to the new Community Health Strategy, each community unit contains 10 community health volunteers (CHVs), who are supervised by five community health extension workers (CHEWs). CHEWs are health professionals linked to the primary health facility (MoH, 2013). This structure can vary per county because of devolution of primary health-care financing and policy (McCullum *et al.*, 2015). In addition, each community unit has a group of volunteers forming a community health committee which is, amongst other responsibilities, tasked with the supervision of CHVs (in addition to supervision conducted by CHEWs) (MoH, 2013; Kok *et al.*, 2016b). In Malawi, supervision of health surveillance assistants (HSAs) is conducted by senior HSAs and (assistant) environmental health officers at the level of the health centre catchment area; and district level supervisors play a role in supervision for specific programmes (Callaghan-Koru *et al.*, 2013; Kok *et al.*, 2016a). In Mozambique, supervision of *agentes polivalentes*

elementares (APEs) is the responsibility of health workers, usually qualified nurses, from the health facilities of reference for a particular catchment area (MoH, 2010; Ndima *et al.*, 2015).

The intervention

A team of curriculum developers and researchers, in consultation with Kenya’s National Ministry of Health, developed a training manual on supportive group supervision for CHW supervisors. The training manual was adapted from various existing manuals and programme experiences. The manual was piloted in Kasarani sub-County (Nairobi County) with CHV supervisors and was further adapted for use in Ethiopia, Malawi and Mozambique, ensuring it aligned with government strategies and structures in those countries. The supportive supervision training manual covers topics on (1) supportive roles (workers’ welfare), (2) administrative roles (performance-related issues) and (3) educative roles (capacity building) of supervision (Supplementary File S1).

Supportive supervision training and subsequent group supervision were conducted over the course of 1 year in selected sub-locations of Shebedino district in Southern Ethiopia; Kitui and Nairobi counties in

Kenya; Mchinji and Salima districts in Malawi; and Manhiça and Moamba districts in Mozambique. The different aspects of the intervention delivered in each country context are presented in Table 2.

The theory

To assess whether the intervention influenced CHW motivation—and which aspects of the supervision led to this (possible) effect—we developed a theoretical framework (Figure 1).

Motivation in the workplace is defined as an individual's degree of willingness to exert and maintain an effort towards an organization's goals (Franco *et al.*, 2002). It is a critical determinant of performance. Well-performing CHWs would work in ways that are responsive, fair and efficient to achieve the best health outcomes possible for their clients and communities within the constraints of the resources at their disposal (WHO, 2006). As CHWs are situated at the interface between the health sector and communities, not only the organizational commitment but also the commitment towards

Table 2. The CHW supervision intervention in the four countries

Intervention elements	Ethiopia	Kenya	Malawi	Mozambique
Length of supervision training (days)	6	6	5	5
Trainers	NGO, regional health bureau and district health office	NGO, Ministry of Health	NGO, Ministry of Health	University, Ministry of Health
Attendees of supervision training	32 HEW supervisors and 3 coordinators from district health office	3 sub-county Community Health Strategy focal persons, 4 CHEWs, 45 CHV peer supervisors	40 HSAs, 20 senior HSAs and 1520 district managers	16 district and health facility supervisors and 6 provincial and national CHW programme managers
Types of supervision conducted over the year	<ul style="list-style-type: none"> Monthly individual supervision Monthly group supervision 	<ul style="list-style-type: none"> Individual supervision; including joint home visits Monthly group supervision 	<ul style="list-style-type: none"> Fortnightly peer supervision (in blocks of 4–6 HSAs) Self-assessment Monthly group supervision 	Monthly group supervision
New/adjusted supervision tools	Antenatal care checklist (observation tool)	Supervision checklist	New integrated supervision checklist HSA work plan and reporting format HSA self-assessment form	Supervision checklist
Other features	NA	Peer supervision—CHEWs had appointed some CHVs to supervise fellow CHVs. These peer supervisors ensured that other CHVs submitted their monthly reports on time and that they were complete and accurate	Block system introduced, in which senior HSAs organize peer supervision meetings	NA
Implementation period	September 2014–January 2016	June 2015–December 2015	November 2014–December 2015	February 2015–July 2016

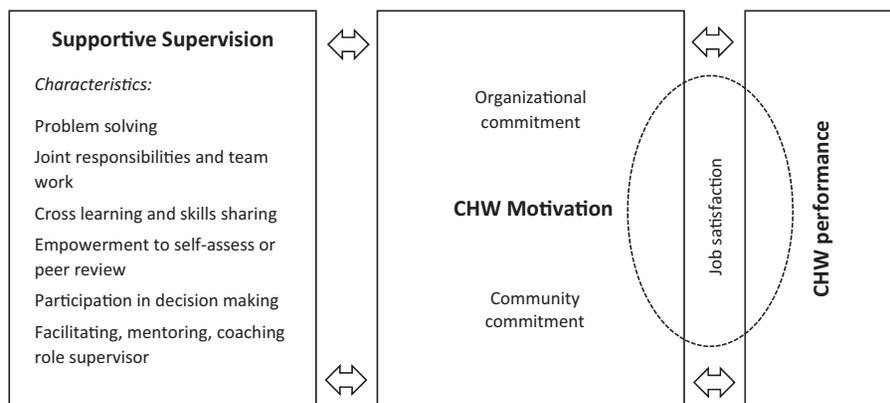


Figure 1. Summary of theoretical framework.

the community should be looked at when assessing motivation as a determinant of performance (Cherrington *et al.*, 2010; Naimoli *et al.*, 2014; Kok *et al.*, 2017). Community context has, maybe more so than for any other cadre of health workers, an influence on CHW performance and programme outcomes (Campbell and Scott, 2011; Strachan *et al.*, 2015). Job satisfaction is not a prerequisite for motivation (Franco *et al.*, 2002) but is often associated with higher levels of motivation and is a known predictor of turnover and absenteeism (Dieleman and Harnmeijer, 2006). It is logical, therefore, that factors influencing CHWs' commitment to the organization (the health sector) and community could influence their job satisfaction and performance.

Evidence in the field of human resource management shows that supportive supervision is a (management) intervention that could increase health worker and CHW motivation and performance (Chen *et al.*, 2004; Rowe *et al.*, 2005; Dieleman and Harnmeijer, 2006; Jaskiewicz and Tulenko, 2012; Kok *et al.*, 2014; Naimoli *et al.*, 2014). Given the intermediary position of CHWs between health sector and communities, and the importance of trusting relationships, the social identity approach could be used to explain how supportive supervision could increase CHW motivation, as outlined by Strachan *et al.* (2015). This collection of behavioural theories demonstrates how the processes that are determining an individual's behaviour (such as motivation) are dependent upon interpersonal relationships and group memberships and their perceived value and significance to the individual (Strachan *et al.*, 2015). This resonates well with the characteristics of optimal supportive supervision identified by Marquez and Kean (2002) as including: a problem-solving focus to assure quality and clients or communities' needs; the entire team (including external supervisors) being responsible for quality; health workers being empowered to monitor and improve own performance; external supervisors acting as facilitators, coaches, mentors and trainers; health workers participating in supervising themselves and each other; and participatory decision making.

The study

We used both qualitative and quantitative methods at three time points in the four countries.¹ An overview of data collection methods and study participants is provided in Figure 2.

Data collection

In-depth interviews were conducted with CHWs, their supervisors and other stakeholders, who were purposefully selected based on their knowledge about the supervision process.² Sample sizes varied per country and were based on reaching data saturation. Qualitative topic guides on levels of motivation, factors influencing motivation and characteristics of supportive supervision of CHWs (Marquez and Kean, 2002) were adjusted, translated and back-translated, and piloted in each country. Data collection was conducted by trained research teams. Daily debriefing sessions with data collectors were held to discuss key findings, refine lines of inquiry and summarize field notes and observations.

Questionnaires were administered to CHWs ($n=278$) prior to the introduction of the supervision training in their catchment areas. The same CHWs were interviewed after the training, and at the end of the intervention. The samples included all CHWs in the catchment area where the intervention took place. In Malawi and Mozambique, participation was variable between the three time points, because of unavailability of CHWs at the time of data collection. None of the CHWs refused to participate. The questionnaire focused on motivation and supervision of CHWs (Supplementary File S2). Motivational outcomes were assessed by using a 12-item, self-reported measure including sub-scales of community commitment (two items), organizational commitment (two items), job satisfaction (four items) and work conscientiousness (desire to work thoroughly and efficiently; four items), adapted from the Motivational Outcome Scale of Mbindyo *et al.* (2009) to make it more focused on CHWs. The six-item Perceived Supervision Scale, which captured different aspects of supervision as described in the literature (May *et al.*, 2004; Mathauer and Imhoff, 2006) was used to measure experiences of supervision from the perspective of CHWs.³ Each item was assessed using a 5-point Likert Scale, anchored by 'strongly disagree' (1) and 'strongly agree' (5). The questionnaire was translated to the local language and back-translated into English to check consistency in all four countries.

Data analysis

Interviews were digitally recorded, transcribed and translated into English or Portuguese (Mozambique). A sample of transcripts was randomly checked against recordings. Transcripts were independently

Ethiopia	August 2014 64 questionnaires HEWs 8 IDIs HEWs	July 2015 64 questionnaires HEWs 8 IDIs HEWs	January 2016 64 questionnaires HEWs 16 IDIs HEWs 8 IDIs supervisors/ managers
Kenya	May 2015 51 questionnaires CHVs 3 IDIs sub-county CHS coordinators 16 IDIs CHVs 4 IDIs CHEWs	December 2015 51 questionnaires CHVs 3 IDIs sub-county CHS coordinators 16 IDIs CHVs 4 IDIs CHEWs	Not Applicable
STAGE			
Malawi	October 2014 124 questionnaires HSAs 8 IDIs HSAs	June 2015 108 questionnaires HSAs 8 IDIs HSAs	December 2015 124 questionnaires HSAs 8 IDIs HSAs 12 IDIs supervisors/ managers
Mozambique	November 2014 37 questionnaires APEs 11 IDIs APEs	June 2015 39 questionnaires APEs 11 IDIs APEs	December 2015 37 questionnaires APEs 11 IDIs APEs

Figure 2. Overview of data collection methods and study participants over time. CHS, Community Health Strategy.

read in pairs by a group of researchers to identify key themes and develop a coding framework. The initial coding framework was based on the topic guides and the theoretical framework; and new themes were added to reflect particular insights from the different country contexts. This process involved researchers and data collectors from the four country contexts and researchers who were involved in all country studies, allowing both insider and outsider perspectives. Transcripts were coded using NVivo (v.10) software. The coded transcripts were further analysed, 'charted' and summarized in narratives for each theme. In this article, presented quotes are derived from the end-line stage.

Changes in mean job satisfaction, organizational commitment, community commitment, conscientiousness and perceived supervision over time in Ethiopia, Malawi and Mozambique were assessed using Friedman's ANOVA. In the instance where significant differences across time points were detected, a *post hoc* Wilcoxon signed-rank test was used. As data from only two time points were available in Kenya, a Wilcoxon signed-rank test was used to assess significant changes across these variables. All data analysis was conducted in SPSS (v. 24.0).

Study findings were validated through meetings with policy makers and programme implementers in all countries. Joint analysis meetings brought together researchers from the four countries and from the UK and the Netherlands (who were involved in designing the research), enabling critical discussion and exchange on inter-country analysis. Furthermore, exchange visits (to Ethiopia and Mozambique) added depth to the discussion on issues of similarity and difference. Country matrices were developed, containing detailed information on how supervision influenced motivation and performance of CHWs in the four countries.

Results

Changes in motivation

Interview participants reported that the group supervision intervention improved CHW motivation, through feelings of recognition, being supported, gaining knowledge, having a shared burden and a sense of belonging and team spirit. There was remarkable concordance on this across the four countries. In all contexts, both CHWs and their supervisors thought that supervision processes and frequency were improved. Many supervisors in all countries reported the intervention to be their first experience in training on supervision. Some study participants explicitly stated that the supervision approach increased CHW motivation:

I [now] have a regular supervisor, who is always working with us. He visits us two times per week. All the time in any case we sit and discuss together and plan on the gaps. This has positive impact on our motivation (HEW, Shebedino, Ethiopia).

... the CHVs [peer CHV supervisors] who are trained, now have the knowledge on supervision unlike earlier where we had like dictatorial kind of supervision. Now we have a soft approach, also now they know what they are looking for, also there is kind of motivation. You find that the CHVs feel that now somebody is looking at our work so they have to do good work (Sub-County focal person, Nairobi, Kenya).

Although the qualitative study component revealed that CHWs and their supervisors thought that the intervention generally led to improved motivation and supervision, this improvement was not substantiated by observed changes in motivation-related outcomes and perceived supervision, as measured by the questionnaire.

Significant changes in job satisfaction scores were observed across the three time points in Ethiopia [$\chi^2(2) = 8.50, P = 0.01$] and Mozambique [$\chi^2(2) = 6.33, P = 0.04$]. In Ethiopia, levels of job satisfaction were significantly higher at baseline (Mdn = 5) than midline (Mdn = 4.75), $z = -2.81, P = 0.01, r = -0.25$, with an overall significant decrease reported from baseline (Mdn = 5.00) to end line (Mdn = 4.75), $z = -2.97, P = 0.00, r = -0.26$. In contrast, job satisfaction increased significantly from baseline (Mdn = 4.00) to end line (Mdn = 4.25) in Mozambique, $z = 2.29, P = 0.02, r = 0.27$. No significant changes in job satisfaction were observed in Malawi [$\chi^2(2) = 1.91, P = 0.38$], or in Kenya, $z = -0.75, P = 0.46$.

No significant changes in organizational commitment were reported in Mozambique [$\chi^2(2) = 2.53, P = 0.28$], or in Kenya, $z = -1.19, P = 0.24$. However, significant changes in organizational commitment were reported in Ethiopia [$\chi^2(2) = 9.99, P = 0.01$] and in Malawi [$\chi^2(2) = 9.37, P = 0.01$]. In Ethiopia, organizational commitment decreased significantly from baseline (Mdn = 5.00) to midline (Mdn = 4.50), $z = -2.80, P = 0.01, r = -0.25$, with an overall decrease from baseline to end line (Mdn = 4.50), $z = -2.26, P = 0.02, r = -0.20$. In contrast, Malawi reported an overall increase in organizational commitment from baseline (Mdn = 4.00) to end line (Mdn = 4.50), $z = 3.22, P = 0.00, r = 0.22$.

No significant changes in community commitment were observed in any of the four countries, including Mozambique [$\chi^2(2) = 3.85, P = 0.15$], Ethiopia [$\chi^2(2) = 2.23, P = 0.33$], Malawi [$\chi^2(2) = 2.79, P = 0.25$] and Kenya ($z = -0.95, P = 0.34$). Likewise, no significant changes were observed in reported levels of work conscientiousness in Mozambique [$\chi^2(2) = 3.73, P = 0.16$] and Ethiopia [$\chi^2(2) = 3.12, P = 0.21$]. However, changes in work conscientiousness were observed in Malawi and Kenya. In Malawi, significant increases were observed from baseline (Mdn = 4.25) to end line (Mdn = 4.50), $z = 2.45, P = 0.01, r = 0.20$. In Kenya, work conscientiousness significantly decreased from baseline (Mdn = 4.50) to midline (Mdn = 4.25), $z = -2.88, P = 0.00, r = -0.29$. Results for the motivation-related outcomes across all countries, at each assessment period, are summarized in Table 3.

Changes in supervision

CHWs and supervisors mentioned various aspects of supervision that contributed to how supportive the supervision was perceived. These were related to problem solving, joint responsibilities and teamwork, cross learning and skills sharing, empowerment and participation, and the role of the supervisor.

From fault-finding to problem solving

The problem-solving approach of the supportive supervision intervention was mentioned by the majority of the study participants—both CHWs and their supervisors—as positively contributing towards CHW motivation.

During previous supervision, they [supervisors] came and checked the registers. Currently, they ask us how some activities are over achieved and why some activities are under achieved and discuss on the solutions and they help us to improve (HEW, Shebedino, Ethiopia).

I have noticed now that it is way easier for us to come here and talk about our problems rather than in the past when we would all just handle the problems we were facing on our own. Now we discuss and try to come up with a way forward. Ever since the programme started which assembled us into blocks, work has been made easy because if you have a problem somewhere you can discuss with your block members and help each other out (HSA, Salima, Malawi).

Table 3. Results of *post hoc* analysis, using Wilcoxon signed-rank test, to assess changes in job satisfaction, community commitment, organizational commitment and work conscientiousness across Ethiopia, Kenya, Malawi and Mozambique

Country	<i>n</i>	Median	Time	<i>z</i>	<i>P</i> -value	Effect size (<i>r</i>)
Job satisfaction						
Ethiopia						
Baseline (t0)	64	5.00	t0→t1	-2.81	0.01*	-0.25
Midterm (t1)	64	4.75	t1→t2	-0.28	0.782	-0.02
End line (t2)	64	4.75	t0→t2	-2.97	0.00*	-0.26
Kenya						
Baseline (t0)	51	4.25	t0→t1	-0.75	0.46	-0.07
Midterm (t1)	51	4.00				
End line (t2) ^a						
Malawi						
Baseline (t0)	124	4.25	t0→t1	1.81	0.24	0.12
Midterm (t1)	108	4.50	t1→t2	-0.35	0.73	-0.02
End line (t2)	124	4.50	t0→t2	1.43	0.15	0.09
Mozambique						
Baseline (t0)	37	4.00	t0→t1	1.90	0.06	0.22
Midterm (t1)	39	4.25	t1→t2	1.00	0.32	0.12
End line (t2)	37	4.25	t0→t2	2.29	0.02*	0.27
Community commitment						
Ethiopia						
Baseline (t0)	64	5.00	t0→t1	0.70	0.48	0.06
Midterm (t1)	64	5.00	t1→t2	1.49	0.14	0.13
End line (t2)	64	5.00	t0→t2	-1.03	0.30	-0.09
Kenya						
Baseline (t0)	51	4.50	t0→t1	-0.95	0.34	-0.09
Midterm (t1)	51	4.00				
End line (t2) ^a						
Malawi						
Baseline (t0)	124	4.50	t0→t1	1.44	0.15	0.10
Midterm (t1)	108	4.50	t1→t2	0.35	0.73	0.02
End line (t2)	124	4.50	t0→t2	1.91	0.06	0.12
Mozambique						
Baseline (t0)	37	4.00	t0→t1	1.64	0.10	0.19
Midterm (t1)	39	4.50	t1→t2	1.00	0.32	0.12
End line (t2)	37	4.50	t0→t2	1.54	0.12	0.18
Organizational commitment						
Ethiopia						
Baseline (t0)	64	5.00	t0→t1	-2.80	0.01*	-0.25
Midterm (t1)	64	5.00	t1→t2	-0.67	0.50	-0.06
End line (t2)	64	5.00	t0→t2	-2.26	0.02*	-0.20
Kenya						
Baseline (t0)	51	4.50	t0→t1	-1.19	0.24	-0.12
Midterm (t1)	51	4.00				
End line (t2) ^a						
Malawi						
Baseline (t0)	124	4.50	t0→t1	1.86	0.06	0.13
Midterm (t1)	108	4.50	t1→t2	-0.59	0.56	-0.04
End line (t2)	124	4.50	t0→t2	3.22	0.00*	0.20
Mozambique						
Baseline (t0)	37	4.00	t0→t1	0.64	0.52	0.07
Midterm (t1)	39	4.50	t1→t2	1.41	0.16	0.16
End line (t2)	37	4.50	t0→t2	0.43	0.66	0.05
Work conscientiousness						
Ethiopia						
Baseline (t0)	64	5.00	t0→t1	-0.25	0.80	-0.02
Midterm (t1)	64	4.88	t1→t2	-1.50	0.13	-0.13
End line (t2)	64	5.00	t0→t2	-0.60	0.55	-0.05
Kenya						
Baseline (t0)	51	4.50	t0→t1	-2.88	0.00*	-0.29
Midterm (t1)	51	4.25				
End line (t2) ^a						

(continued)

Table 3. (continued)

Country	<i>n</i>	Median	Time	<i>z</i>	<i>P</i> -value	Effect size (<i>r</i>)
Malawi						
Baseline (t0)	124	4.25	t0→t1	0.98	0.33	0.07
Midterm (t1)	108	4.50	t1→t2	-0.78	0.44	-0.05
End line (t2)	124	4.50	t0→t2	2.45	0.01*	0.16
Mozambique						
Baseline (t0)	37	4.00	t0→t1	1.58	0.11	0.18
Midterm (t1)	39	4.25	t1→t2	1.34	0.18	0.16
End line (t2)	37	4.25	t0→t2	1.25	0.21	0.15

^aNo data available at Time 2 for Kenya.

*All *P*-values significantly <0.05.

Joint responsibilities and team work

The discussion of problems in a group, whether with supervisors from the 'upper' level or with peers, reportedly enhanced teamwork.

Then, we were using orders, so instead of orders, it is dialogue, instead of forcing, it is agreeing. And also we do share, before we do anything. If there must be something to talk about, so we talk about it and be in the same journey (CHV team leader, Nairobi, Kenya).

In Kenya and Malawi, where peer supervision took place, some participants reported that this team work went further than joint discussions of problems. They reported that the coordination of tasks between CHWs and other health professionals and CHWs assisting each other with their tasks were either part of the group supervision meetings, or took place after these meetings.

... If there is something that happened in the hospital she [the supervisor] reports to us as the team leaders. For instance the polio campaign, she would tell us about it and then she would ask if you have a patient that is severely sick and you probably need the doctors to come and see that person at home [then the CHV should refer], so we discuss such things (CHV team leader, Nairobi, Kenya).

We are lucky that we have been organized into a block in our area. We work as a team. When a job is too involving for one person to do, we go together as a team to the area of one person and do the job as a team. Then we write the report. We then do the same for the area of another person. In this way, the job is not as cumbersome (HSA, Salima, Malawi).

The peer supervision in Malawi also led to HSAs feeling more accountable to each other and the organization. In this case, the group membership and the joint responsibility, e.g. in coming up with a certain report, were perceived as motivating:

We meet maybe six HSAs per block, so if you are absent you are easily noted that you didn't come; unlike when we used to be meeting all 28 HSAs at once, you could decide not to attend and you wouldn't be noted that you didn't attend. This system is good because if you are supposed to write a report, they are just delegating to a block what needs to be done, in this way we are having ownership and becoming accountable to what we are doing; unlike in the past when we would just say that someone else will do it, now things are changed and we are being encouraged to take stock and report on the same (HSA, Salima, Malawi).

However, CHWs did not always feel that joint responsibilities and teamwork were taking place. Some CHVs from Nairobi County, Kenya, indicated that their supervisor was still located too far away and only occasionally joined household visits.

Cross learning and skills sharing

In all countries, CHWs reported that the supervision intervention brought them knowledge, which was motivating. Often, new knowledge and skills were reported to be obtained from the supervisor. For example, APEs considered that supervision and the accompanying mentorship served ongoing education and learning, which were key factors in maintaining their motivation.

Health workers encourage me to work well with people, because they always come to supervise. The technician and I go together to visit the homes, she always comes to jointly do the rounds in the community ... During the meetings, we get to know how each one is working and we can learn about many things with the supervisor (APE, Mozambique).

In Malawi, participants also referred to cross-learning through group dialogue.

We gain a lot of knowledge in these meetings, because one may know one thing which the others may not know; and in the course of discussing, you get some knowledge from one another (HSA, Salima, Malawi).

Empowerment and participation

It is clear from the above that joint problem solving and teamwork involved participation of CHWs in efforts to improve their performance. However, the interviews did not reveal participation of CHWs in decision making that went beyond their regular tasks. In addition, the self-assessment tool introduced in Malawi was hardly used, and therefore this opportunity for empowerment via self-reflection was missed.

The role of the supervisor: facilitation and coaching

A number of study participants stressed how the supervisors' approach had changed. This went beyond the correct use of existing or newly introduced tools (in the case of Ethiopia and Malawi) to include focus on coaching or mentorship and (written or oral) feedback about performance.

They [supervisors] conduct the visit with checklists and give us a written report [feedback] on our good sides and things to be improved (HEW, Shebedino, Ethiopia).

When you are supervising you are like a mentor. You also mentor those you are supervising, especially now we are talking of supportive supervision, not the previous supervisions, when people went to ... to look for the wrongs. Today we support while supervising ... You also feel some satisfaction if this person heeds your advice (Sub-County focal person, Kitui, Kenya).

Supervision constraints

Despite the supervision intervention being regarded as positive and supportive, certain aspects of the system remained problematic. A contextual factor that limited supportive supervision in all four contexts was the challenge of frequent turnover of trained supervisors.

But the problem is the majority of the supervisors, who took training, are now transferred to another district or joined upgrading ... (HEW, Shebedino, Ethiopia).

In Kenya, CHVs reported that they have to compile too many reports for different programmes, supervised by different people or organizations. In Malawi, this problem was solved with the introduction of an integrated supervision checklist. Availability of transport and stationary (for reporting) also remained problematic in many settings.

Quantitative changes in perceived supervision

In contrast to the above results from the qualitative study component, no significant changes in perceived supervision were observed from base- to end line in Ethiopia [$\chi^2(2) = 5.36, P = 0.07$], Malawi [$\chi^2(2) = 3.95, P = 0.14$], Mozambique [$\chi^2(2) = 4.19, P = 0.12$] or Kenya ($z = -0.85, P = 0.39$).

Discussion

This study is largely consistent with existing evidence, indicating that supportive supervision is an important element of CHW programmes, which can contribute to improved CHW motivation and performance. Although there were no consistent quantifiable effects of the supportive supervision intervention on CHW motivational outcomes across the four countries, the qualitative findings suggest that there is potential for integrating supportive group supervision models in CHW programmes. In doing so, specific attention is needed to ensure that cross-learning and CHW participation in decision making are taking place. In addition, the findings show that a combination of group with individual supervision, preferably accompanied with checklists to assess CHW performance and corresponding feedback systems, as well as peer supervision, could yield a stronger impact on CHW motivation and performance. The inclusion of self-assessment in CHW supervision models needs further research.

Other implementation studies have also yielded different findings from different methods. A recent study on the effect of a supportive supervision intervention for facility-based health workers in Mozambique also found no statistical differences in job satisfaction and work engagement between base- and end line, but did show that health workers perceived the intervention as contributing to motivation and improved performance (Madede *et al.*, 2017). The complexity of CHWs' interface role and the multiple factors that could contribute to CHW motivation could contribute to the observed discrepancies in quantitative and qualitative findings. Although the qualitative component specifically focused on participants' perceptions on supervision, the quantitative component measured motivation as a possible 'outcome' of the supervision intervention that was introduced; however, other factors could also have influenced the measured motivation as well. The questionnaire contained not only supervision-specific statements but also statements that were not directly related to supervision (Supplementary File S2). Differences between quantitative and qualitative findings could also be explained by the influence of the intervention or frequent

questionnaires on respondents' perceptions. As median motivational outcome scores were already high in all countries at baseline, it is possible that the intervention or the repeated questionnaires enabled CHWs to reflect more critically on the supervision process, their experience with this and their motivation. This could partly explain stable or decreasing values in perceived supervision, organizational and community commitment, job satisfaction and work conscientiousness. Similarly, and given the maximum score of '5' on each of the items, a 'ceiling effect', whereby the potential to measure increasing scores across variables is reduced, may have prevented the detection of observable differences in scores across time.

Similar to the findings of several reviews that draw on mainly qualitative studies, supportive supervision was positively evaluated by all stakeholders interviewed and seemed to result in increased (perceived) performance (Rowe *et al.*, 2005; Jaskiewicz and Tulenko, 2012; Kok *et al.*, 2014; Naimoli *et al.*, 2014). Qualitative research could, on the one hand, be compromised by participants giving socially desirable answers, and on the other hand, reveal more in-depth information related to certain behaviour that might be difficult to measure over a short period of time. In addition, contextual factors that could influence motivation but are not related to the intervention under study can be identified during in-depth interviews. For example, in Mozambique, many interviewed APEs had not received their subsidy for 5 months, whereas in Kenya, the new Community Health Strategy led to CHVs being let go and others to be recruited at the country level. This could have influenced the findings related to organizational commitment. The data collectors, who were familiar with the contexts and experienced in conducting qualitative research, built rapport with study participants and were able to have open and in-depth discussions with them. Besides the reported perceived supervision and motivation (as opposed to motivational outcomes measured using the questionnaire), the in-depth discussions focused more on the changes in the process of the supervision, which were mostly (but not entirely) positively evaluated. The aspects of the supervision intervention that were reported to contribute to motivation the most were supported by the social identity approach (Strachan *et al.*, 2015). Interpersonal and group relationships were found to be important in all countries, in the form of joint problem solving, shared responsibilities and team work. This calls for more in-depth research into the human interactions involved in supervision (John Clements *et al.*, 2007), e.g. through adding observations in CHW study designs.

Findings show that supportive supervision could optimize the interface position of CHWs between communities and the health sector, thereby enhancing health system performance, as also highlighted by earlier studies (Glenton *et al.*, 2013; Kok *et al.*, 2017). The interface position of CHWs can result in emotional burden and workload when interacting and dealing with (expectations from) both the community and the health sector (Glenton *et al.*, 2013; Maes and Kalofonos, 2013; Cataldo *et al.*, 2015; Mundeve *et al.*, 2018). We found that CHWs in all four settings perceived supportive supervision from health professionals and peers, e.g. of the form of joint household visits and sharing workload, to assist them in this regard.

This study included the views of CHWs, their supervisors and, in selected countries, higher-level managers. The importance of analysing possible gaps in supervision and moving towards more supportive supervision at the policy and management level has been stressed before (Bradley *et al.*, 2013; Nkomazana *et al.*, 2016). It is therefore also important to further analyse supervisors' motivation and the barriers and facilitators they face in conducting their supervisory job, and how these could influence CHW motivation and

performance (Daniels *et al.*, 2010; Akintola and Chikoko, 2016). The adoption of supportive supervision by all stakeholders could enhance sustainability of the approach and its results. Although supportive supervision interventions have been evaluated positively on a pilot basis, sustained improvements at scale have rarely been documented. Continued investments and systemic changes in human resource management and the health system at large are needed to maintain the gains of pilot interventions (Marquez and Kean, 2002).

The study had several limitations. The supportive supervision intervention that was introduced was studied during the period of 1 year in specific areas with limited sample sizes, which may not be sufficient to draw conclusions about sustained effects. The intervention did not focus on communities' role in supervision or monitoring of CHWs. Community commitment is a component of CHW motivation, and therefore it is important to conduct further research on the possible effects of community involvement in supervision or monitoring of CHWs' work. In addition, the intervention was conducted in four different countries and contexts, and implemented slightly differently across the country contexts (see Table 2). Despite this, we were able to collect information on which aspects resulted in the supervision being perceived as more or less supportive. These aspects were mostly similar across the different contexts and were sometimes related to the different ways in which the intervention was implemented. Therefore, these findings are valuable for continued efforts in improving CHW supervision systems and enhancing health systems' performance in the four countries and beyond.

Conclusion

Although qualitative and quantitative findings differed, training of supervisors in supportive supervision, and subsequent implementation of group supervision, preferably combined with individual and peer supervision have the potential to improve CHW motivation and performance. Supervision interventions need to be embedded in broader health system strengthening to be able to make sustainable contributions towards performance of CHWs.

Ethics

A generic study protocol was approved by the Liverpool School of Tropical Medicine (Research protocol 14.007). Country-specific research protocols were approved by the South Nation Nationalities and Peoples Region Health Bureau Research and Technology Transfer Core Process of South Ethiopia in Ethiopia; the Kenya Medical Research Institute Ethics and Review Committee in Kenya; the National Health Sciences Research Committee in Malawi; and the Institutional Review Joint-Board of the Faculty of Medicine of the University Eduardo Mondlane and Maputo Central Hospital in Mozambique.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online.

Notes

1. The study in Kenya only included two time points, because of a delay in the introduction of the intervention due to staff reshuffling and new boundary setting related to devolution.
2. Both motivated and less motivated CHWs were interviewed, and selection was based on questionnaire findings.
3. <https://www.perceivedsupervisionscale.com/>.

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