



Do community health workers perceive mechanisms associated with the success of community case management of malaria? A qualitative study from Burkina Faso



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ABSTRACT

The use of community health workers to administer prompt treatments is gaining popularity in most sub-Saharan African countries. Their performance is a key challenge because it varies considerably, depending on the context, while being closely associated with the effectiveness of case management strategies. What determines community health workers' performance is still under debate. Based on a realist perspective, a systematic review recently hypothesized that several mechanisms are associated with good performance and successful community interventions. In order to empirically investigate this hypothesis and confront it with the reality, we conducted a study in Burkina Faso, where in 2010 health authorities have implemented a national program introducing community case management of malaria. The objective was to assess the presence of the mechanisms in community health workers, and explore the influence of contextual factors. In 2012, we conducted semi-structured interviews with 35 community health workers from a study area established in two similar health districts (Kaya and Zorgho). Results suggest that they perceive most of the mechanisms, except the sense of being valued by the health system and accountability to village members. Analysis shows that drug stock-outs and past experiences of community health workers simultaneously influence the presence of several mechanisms. The lack of integration between governmental and non-governmental interventions and the overall socio-economic deprivation, were also identified as influencing the mechanisms' presence. By focusing on community health workers' agency, this study puts the influence of the context back at the core of the performance debate and raises the question of their ability to perform well in scaled-up anti-malaria programs.

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1. Introduction

Many low- and middle-income countries face a shortage of qualified health personnel (WHO, 2006). This exacerbates the problem of poor access to health services, particularly in rural areas. The use of community health workers (CHWs) to address the human health resources crisis is gaining popularity in these countries

(Haines et al., 2007; Hongoro and McPake, 2004). CHWs play an essential role in the task-shifting policy promoted by the World Health Organization (WHO, 2008) and are the cornerstone of a global strategy to help sub-Saharan African countries to achieve the Millennium Development Goals (Christopher et al., 2011; Singh and Sachs, 2013).

CHWs are usually defined as individuals who received basic health training and work in the community where they live. The range of activities now entrusted to CHWs is broad; they are used to disseminate health messages, support immunization campaigns, facilitate referrals to health centers or administer treatments for the most widespread diseases, namely malaria, pneumonia, and

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diarrhea (Liu et al., 2011; Standing and Chowdhury, 2008). In sub-Saharan African countries, CHWs are increasingly required to act as front-line clinicians, notably in efforts to fight HIV/AIDS and malaria (Druetz et al., 2014; Schneider et al., 2008).

Using CHWs to administer treatments in remote areas and reduce the burden of diseases has been an ongoing strategy since the selective primary healthcare policy was established in the 1980s. Studies suggest that this strategy is effective in reducing morbidity or mortality (Lewin et al., 2010; Winch et al., 2005), but implementation issues concerning quality of care, collaboration with health services, scaling-up, sustainability, etc., diminish its effectiveness under real-life operating conditions (Berman et al., 1987; Rifkin, 1996; Walt, 1990). Furthermore, CHWs' performance and its determinants (such as initial training, supervision, level of education, types of incentives, etc.) vary a great deal depending on the context (Bhattacharyya et al., 2001; Lehmann and Sanders, 2007; Perry and Zulliger, 2012; Takasugi and Lee, 2012). This issue has recently received considerable attention, since it represents one of the major challenges encountered by CHW-based programs. However, most of the literature has examined the topic by focusing on barriers or incentives to CHWs' performance. The debate surrounding what motivates CHWs is still salient, especially the issue of their remuneration (Greenspan et al., 2013). Undeniably, CHWs and community case management (CCM) are not an easy solution to health system deficiencies (Haines et al., 2007).

A WHO-mandated study published by Kane et al. recently examined how CHWs' performance is achieved rather than looking at what produces it locally (Kane et al., 2010). Based on a systematic review of the evidence on CCM of malaria (CCMm), the authors identified several mechanisms associated with CHWs' performance. In the realist perspective they took, mechanisms are schemes of individuals' reasoning facing an intervention in certain contexts (Pawson and Tilley, 1997). The realist review they conducted identified the key mechanisms that prevail in CHWs' performance and the success of CCMm.

Kane et al.'s hypotheses are original because they conceptualize CHWs' performance as the result of triggering of or not triggering of certain mechanisms. But they also acknowledge that CHWs' agency in triggering these mechanisms is not absolute, but contained by context-intervention dynamics. Mechanisms are thus the result of complex interactions between the context, the intervention and CHWs. While "integrated-CCM" is already under development (WHO and UNICEF, 2012), it is particularly relevant to explore how CHWs achieve good performance in case management programs.

To our knowledge, no empirical study has ever investigated the presence of the identified mechanisms in CHWs. There is currently a lack of qualitative research that shed light on how CHWs' interventions are effective (Glenton et al., 2011). Therefore, the objective of this study is to empirically investigate Kane et al.' theoretical framework by assessing the presence of the mechanisms in CHWs involved in the Burkinabe national anti-malaria program and exploring contextual factors related to their presence.

2. Description of the program

In 2010, Burkina Faso implemented a national anti-malaria program designated as the MEILUP (Ministère de la Santé, 2010). The MEILUP aims to reduce malaria-attributable mortality and morbidity by introducing two interventions. The first consisted of a universal campaign to distribute long-lasting impregnated bed nets. It took place around September 2010. The second is the introduction of CCMm. In late 2010, one CHW per village was recruited to administer artemisinin-combination therapies (ACT) to febrile individuals suspected of being malaria cases. All CHWs received 2 days of initial training and were provided with some

material. CHWs carry out curative (presumptive administration of treatments) and preventive (message dissemination) activities. Consultations with CHWs are free of charge, but treatments cost 100–300 francs CFA, depending on the individual's age. CHWs refer severe cases to the nearest health center.

The MEILUP established a partnership between national authorities and non-governmental organizations (NGOs). NGOs recruited non-health professionals to supervise CHWs – each NGO supervisor being put in charge of approximately 15 CHWs. NGO supervisors co-led awareness sessions with CHWs and bring them monthly compensation of 5000 Francs CFA. Further details on the program and its implementation fidelity are available elsewhere (Ridde et al., 2013).

3. Methodology

3.1. Methodological approach

This study is an empirical investigation of Kane et al.' hypotheses, which postulate that CHWs' performance and the likelihood of community intervention's success are higher when several mechanisms are triggered (Kane et al., 2010). Kane et al. identified mechanisms corresponding to the 3 types of interventions: (a) training interventions; (b) health system-related interventions; or (c) interventions involving better positioning of the CHW within the community. The total number of mechanisms is 11, but 3 of them are duplicates; so there are 9 different mechanisms. Out of these, we focus on the 7 mechanisms associated with types (b) and (c) – the program under study can hardly be included in category (a), since training was limited to 1–2 days and did not constitute an objective of MEILUP. These 7 mechanisms are presented in Box 1.

Based on a pragmatist epistemology, our analysis followed a two-stage mixed deductive-inductive approach (Creswell and Plano Clark, 2011). We primarily adopted a deductive analytical approach to assess the presence of mechanisms as precursors of CHWs' performance. This study was also inductive, since we explored CHWs' justifications of the presence/absence of the mechanisms and the factors related to them. We used a framework

Box 1

The 7 mechanisms under study and the type of intervention to which they correspond (Kane et al., 2010).

Type of intervention 1: Health systems related interventions.

1. Sense of relatedness to the local public health services, and thus accountability to the system
2. Sense of credibility and legitimacy in being part of local public health services
3. Anticipation of being valued by local public health services
4. Assurance that there is a system for back-up support

Type of intervention 2: Interventions involving better positioning of the CHW within communities.

5. Perception of improvement in social status and playing a valuable role
6. Sense of relatedness and accountability to the beneficiaries
7. Anticipation of being valued by the community

analysis process to analyze data because it enabled us to start from Kane et al.'s theoretical framework and subsequently integrate emerging coding themes (Ritchie and Spenser, 1994). Mechanisms were thus operationalized as objects of study. This explains why our study is not a realist evaluation, even if we rely upon a realist synthesis and use its theoretical outputs. Through this empirical investigation in the Burkina Faso context, the theoretical model will be refined and adapted to help national health planners and decision-makers concerning the use of CHWs. Our enterprise is facilitated by the inherent adaptability of realist theories to local realities and demonstrates the usefulness of this approach. As one of the first such efforts, this study is also of methodological interest.

3.2. Description of study sites

This study is part of a research program evaluating the implementation and impacts of MEILUP in two separate districts, Kaya and Zorgho (Fig. 1). The site of Kaya was first selected because of the presence of a demographic surveillance system that provides data on child mortality and household characteristics (Kouanda et al., 2013). The survey site includes 15 villages and 2 urban sectors. The site of Zorgho was selected because of its similarity to the Kaya district (Table 1). The study site of Zorgho includes 17 villages and 1 urban sector.

Prior to this study, a multiple case study was conducted by the research team to assess MEILUP implementation fidelity (Ridde et al., 2013). The fidelity was found good and similar between sites, although we observed some process differences: the involvement of NGO supervisors was larger in Zorgho; CHWs' remuneration was less irregular in Kaya; and the distribution of

Table 1
Characteristics of study sites.

	Kaya district	Zorgho district
Number of malaria infections per inhabitant per year	0.25	0.38
Annual rainfall	506 mm	661 mm
Households below the poverty line	44%	41%
Main spoken language	90% (Mooré)	89% (Mooré)
Population	500 208	352 003
Distance from capital city	98 km	103 km
NGO contracted by PLAN for CCM regional coordination	URCB	Songtaaba

Table adapted from Ridde et al. (2013).

material was not exactly the same between the two districts. The schedule of implementation was also different – Kaya was chosen as a pilot site for CCM. Therefore, in Kaya, CHWs had been managing malaria cases since June 2010 (6 months before CCM was introduced in Zorgho).

Two NGO-driven concomitant interventions are present in Kaya. The first started in October 2010 and is funded by the *Bill and Melinda Gates Foundation*. It consists of integrated-CCM. CHWs were recruited and trained to manage severe malnutrition, malaria and diarrhea in children under 5 years old. Two CHWs thus operated in each village in the Kaya site; one in charge of CCM (for everyone) and the second in charge of integrated-CCM (for children only). The second intervention was implemented in July 2011 by *Save the Children*. It removed user fees (including consultations and prescribed treatments) for all children under 5. This intervention

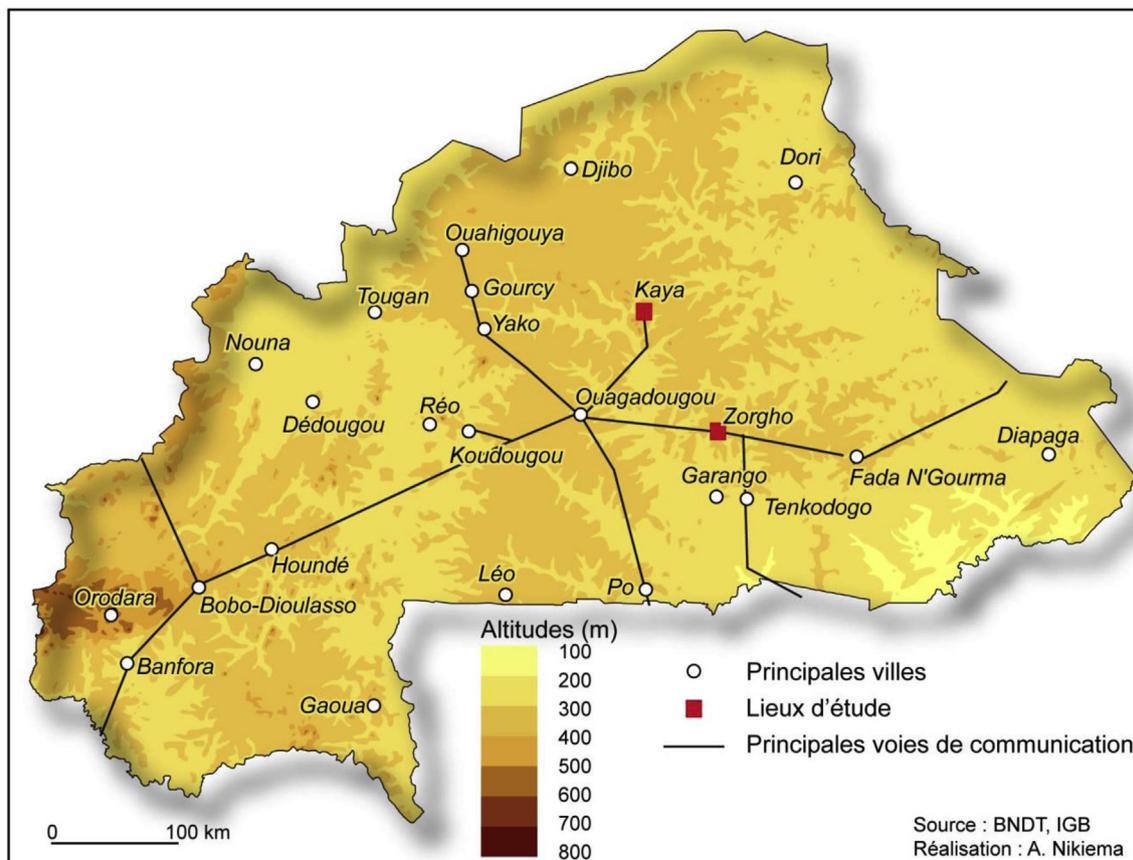


Fig. 1. Location of study sites in Burkina Faso.

only applies to health centers, not to CHWs, who still sell antimalarial treatments to children. The use of a comparison site with no additional interventions (Zorgho) was deliberate to investigate such contextual influences.

3.3. Data collection

The interview guide was first developed by members of the research team, based upon Kane et al.'s theoretical framework. It was then translated into Mooré with the assistance of several members of the *Institut de Recherche en Sciences de la Santé*. Given the fact that most CHWs are illiterate, some concepts (e.g. accountability) were difficult to translate. In such instances, we used re-phrasings and prepared illustrations. A pre-test of the interview guide was performed in May 2012 on two CHWs living in Kaya but out of the study area without noticeable comprehension problems. Each mechanism was operationalized by 2 or 3 open-ended questions.

Sampling of CHWs was exhaustive – all CHW in charge of CCMm in the study area ($n = 35$) were contacted by telephone and asked for an interview. Two CHWs from Kaya (12%) and 6 CHWs from Zorgho (33%) were unavailable. We did not try to re-contact them later because data saturation had been achieved. All of the 27 remaining CHWs agreed to the study. Semi-structured interviews were performed in Mooré by a research assistant from the *Institut de Recherche en Sciences de la Santé*. CHWs knew that the *Institut* is located in Ouagadougou and is independent from the health system. Interviews lasted approximately one hour and were conducted in June 2012. They were digitally recorded, transcribed and translated into French.

3.4. Data analysis

In order to increase internal validity, the material was independently reviewed and analyzed by two of the authors (TD, KK). Very few coding divergences occurred ($n < 5$). They were discussed and resolved by reconciliation – most of the divergences were found plausible after clarification. Transcripts were coded using QSR Nvivo10[®]. The coding was mixed because it embraced both (i) deductive and (ii) inductive approaches to thematic analysis (Miles and Huberman, 2003).

It was deductive because we first relied on Kane et al.'s (2010) analytical framework to investigate the presence of mechanisms in CHWs. The analysis revealed that CHWs' perceptions were often more nuanced than what binary coding (presence/absence) allowed. Some perceptions have fluctuated since the beginning of CCMm – e.g. a CHW may have perceived himself/herself as not credible at the outset of CCMm, but credible at the time of the study. In other instances, the perception of a mechanism might have been constant but moderate and impossible to cut clearly between present and absent.

Coding was also inductive since we explored themes emerging from CHWs' explanations to the perception of mechanisms. For instance, beyond investigating whether CHWs perceive that their social status has improved, we explored how they explain their perceptions and what influences them. This led to identifying barriers and facilitating factors for the perception of mechanisms. These barriers and facilitating factors were coded whenever they correlated with the program itself, its local adaptation or the context.

3.5. Ethical approval

This study was approved by the health research ethics committees of Burkina Faso and the *Université de Montréal* Hospital

Research Centre in Montreal, Canada. Verbal consent was obtained for every participant and digitally recorded. The participation in the study was not remunerated.

4. Results

CHWs' main characteristics are presented in Table 2. All CHWs were designated by the nurse-in-charge of the nearest health center. We organized the results by mechanism to avoid confusion, even if it is artificial to separate them categorically. A synthesis of major results is presented in the [Supplementary data](#).

4.1. Sense of relatedness to local public health services, and thus accountability to the system

All CHWs expressed sense of relatedness to the local health services, primarily because they feel contributing to the same objective (the population's well-being). Factors promoting their relatedness are the referral procedure for severe cases to the health center, and CHWs' designation and supervision by nurses. CCMm promoted a sense of relatedness that was already there – 93% of the CHWs (25/27) had occasionally served as health auxiliaries or CHWs prior to CCMm.

“I feel I am part of the Burkinabe health system. [...] As CHWs we administer treatments so we contribute to the population's health. I have always had this feeling of being part of the health system, even before CCMm. I had this feeling before and CCMm reinforced it” (Z2).

In Kaya, CHWs perceive themselves as being accountable to the health system or, more exactly, to the nurses. They send them a monthly activity report – even CHWs who cannot write and do not send reports feel that this requirement holds them accountable. In their understanding, reports are essential; CCMm would stop if they were no longer asked to produce reports. Accountability is reinforced by the feeling of being employees of the health center – although they are not.

“Yes, I am accountable. Every month we produce reports to give to the nurse. We evaluate the number of sick individuals we have treated, the number of sick individuals we have referred and the number of awareness sessions we have held” (K3).

In Zorgho, this feeling of accountability is more complex because NGO supervisors are put in charge of medical supervision, monthly report collection and drug supplies, in addition to their regular tasks. CHWs feel a dissonance: how could they be related to the health system without keeping the system informed of their activities?

“Normally we should send our reports to nurses because they are agents of the health system. We cannot work for the health system without keeping them informed of our activities” (Z7).

Table 2
Characteristics of CHWs.

	Kaya	Zorgho
Female (%)	13%	17%
Went to school in French (%)	40%	45%
Are literate in Mooré (%)	60%	56%
Already CHWs prior to CCMm (%)	93%	92%
Average time being a CHW (years)	18	15

Source: Interviews.

In Zorgho, the double chain of supervision troubled CHWs because of the lack of integration between the health system and partners from civil society.

“The nurse helped us a lot, he supported us a lot, but the NGO supervisors gave us bicycles and drugs. The nurse assists us in our activities. I think it would be helpful if they could help each other [...]” (Z5).

4.2. Sense of credibility and legitimacy in being part of local public health services

CHWs feel that the village has confidence in their capacities to treat malaria. They acknowledge that some individuals certainly go directly to the health center. However, CHWs believe that few individuals avoid them and when they do, are generally driven by reasons other than a lack of trust: proximity to the health center, severity of symptoms, CHW's unavailability, or drug stock-outs.

CHWs distinguish 2 loci of trust. First, they believe the population trusts them personally because they come from the same village – while nurses are state employees, often coming from another region. Second, CHWs feel that the population trusts their abilities. Several factors foster that feeling: the material and training received; the fact of being literate; different procedures for collaboration established with the nurse (Box 2); and ACT efficacy. Treatment efficacy contributes to restoring the confidence that was lost by the population when CHWs used to administer nivaquine, whose efficacy was compromised by increasing parasite resistance (Carter and Mendis, 2002).

“Yes, they trust us but, in the beginning, the drug was new and they did not know that nivaquine had been replaced by this new drug [...]. At that time some said that the drug was not working, but afterwards they realize the drug was effective” (Z8).

CHWs believe that patients' recoveries further boost the population's trust. However, frequent drug stock-outs undermine their credibility and cause discontent in their community. They are sometimes accused of fraud or mismanagement of drugs.

Box 2

Collaboration between CHWs and nurses-in-charge.

CHWs believe that village members trust them more when they see how close the collaboration is between nurses-in-charge and CHWs. Several procedures were mentioned (these were local initiatives, not planned by the MEILUP *per se*):

- The nurse-in-charge co-leads information/awareness sessions with the CHW.
- The CHW escorts febrile cases with severe symptoms to the health center.
- Case referred by the CHW consult the nurse-in-charge without waiting in line.
- Simple febrile cases who avoid the CHW and visit the health center instead are referred by the nurse-in-charge to the CHW.
- CHWs follow up on severe cases they refer to the health center and keep the nurse-in-charge informed of their health status.

“Villagers trusted my abilities to treat malaria but since the drug stock-out they are reluctant [...]. Some come to yell at us, saying that we misled them because we knew it was certainly coming to an end soon” (Z3).

This situation irritates CHWs and sometimes leads them to adopt prohibited practices to preserve the population's confidence.

“Since the lack of ACTs occurred, I have been useless with sick people. Consequently, I regularly go to buy paracetamol [...]. If a sick individual comes to visit me, I give him/her paracetamol to relieve the pain before referring him/her to the health center. It is true they forbid us to sell paracetamol alone, but currently I have no choice” (K8).

Selling paracetamol alone is prohibited because, while attenuating the fever, it delays the administration of appropriate anti-malarial treatments – which can increase lethality (Chaturvedi et al., 2009; McCombie, 1996).

4.3. Anticipation of being valued by local public health services

CHWs believe that their work is important because it reduces nurses' workload, brings care to people who avoid health centers, and reduces delays before treatment. In Kaya, CHWs acknowledge that hardly any children visited them since health care became free-of-charge for them in health centers, but they still administer treatments to adults and believe their mission remains important for them.

CHWs have mixed feelings concerning the value attached by the health system in return for their work. Some believe that the importance of their work is recognized, notably when nurses invite them to health meetings or compliment their work. But many CHWs believe they are not sufficiently valued:

“In any case, we complain because we don't know if the work we are accomplishing is important to them [the health system]. They should pick a day to motivate us because here we say that “if you dance and there is no one to applaud you, you stop dancing.” We know our work is important to the community but we do not know whether our work is important to them or not” (K14).

CHWs often complain about the absence of regular and decent remuneration – their monthly compensation (5000 Francs CFA) comes intermittently. The absence of a regular salary is seen as the cause and not the result of the lack of value attached to their work. They believe that nurses cannot openly highlight the importance of CCMm because CHWs would become proud and stop “volunteering”.

“They [the nurses] do not compliment our work [...]. But I understand them: since we are volunteering, they cannot acknowledge that our work is important to them because they know we are unpaid” (K14).

4.4. Assurance that there is a system for back-up support

All CHWs perceive the existence of back-up support. This back-up is seen as appropriate and necessary, especially to remind them of the drug's posology – some CHWs cannot read the documents distributed during their training.

In Kaya, nurses always personified the back-up support because of their ascendancy on CHWs, their medical skills, and the formal

authority they hold on CHWs. The assurance of back-up is facilitated by the fact that nurses initially trained CHWs and that they are ordinarily easy-to-access at the health center. NGO supervisors may help when they come visiting CHWs, but they are not considered as a back-up.

“If we have a problem we go to the nurse; if he/she is not there, a health agent may be present and give use the help we need [...]” (K14).

In Zorgho, 1/3 of the CHWs seek first help from the NGO supervisor because they were so instructed during their training.

“If I need something, I am going to see the NGO supervisor [...]. During our training, we were told to see the NGO supervisor if we required help, so that is what we are doing” (Z11)

However, 2/3 of the CHWs go first to the nurse in case of problems because he/she is more available and more competent to answer their questions on CCMm.

4.5. Perception of improvement in social status and playing a valuable role

CHWs acknowledge that their social status has improved since the beginning of CCMm, which is illustrated by: (i) their facilitated access to the nurse; (ii) the increased attention paid by the population to their recommendations and (iii) signs of respect received from villagers, notably by being called *logtoré* (doctor). Their monetary compensation and their new skills/material foster this feeling of improved status.

“I have become more important since I have been doing CCMm because whoever sees me calls me logtoré. [...] What has changed since CCMm is that I have become more competent. Now I use a bicycle and every month, I receive a compensation of 5000 francs CFA” (K5).

Another important contributing factor is the possession of effective drugs.

“If you cure someone who later talks about you and your drugs to another sick person and recommends that he/she pay you a visit because you take good care of people, then you know that they respect you more” (K13).

4.6. Sense of relatedness and accountability to beneficiaries

CHWs are closely related to the community they serve. The bond between them is twofold. First, it is a bond of solidarity because they come from the same village and face the same limitations to their capabilities (Sen, 2001). Second, it is a bond of responsibility because CHWs feel in charge of their community's health. CCMm has usually not generated this bond of responsibility but has revitalized it.

“We are tied to the community because of health matters, because they come to us to be treated, because we want to improve the community's health [...]. We are responsible for their [villagers'] health” (K6).

The assigned mandate of being CHWs is perceived as a privilege they have to assume. Sometimes it is also perceived as a constraint

that will last until they are relieved from it, which they normalize by referring to their culture. *“Mossi say: if you put your head in a noose, you have to accept being dragged by a cord”* (Z6). Monetary losses generated by CCMm make some CHWs wanting to stop their activities.

“I have suffered too much with CCMm and no one is going to help me look after my family, despite the fact that we are unpaid for this job. I think I am going to quit CCMm to go and work in artisanal gold mines. Maybe I will earn enough to provide for my family's needs” (K6).

CHWs do not feel accountable to their community. They usually do not report to the village members, unless problems arise (such as a drug stock-out). The village is free to replace them at any time – which a few CHWs unsuccessfully ask their community to do because of the burden CCMm represents for them.

4.7. Anticipation of being valued by the community

CHWs generally feel that the community values their work since the population highly participates in their awareness sessions and welcomes them during their home visits.

Their feeling of being valued is reinforced when villagers thank them after being cured or when villagers cultivate their lands during the rainy season – this solidarity commitment was observed in 1 village only.

“From the chief's house to here, there is not a single house where I am not welcome. I think it is a sign that the population appreciates my work. Some come and say to me: “I did what you told me to do and it really helped me”” (Z3).

Drug stock-outs undermine CHWs' perception of being valued. They not only discredit their ability to treat malaria, but also reduce community participation in awareness sessions.

“The community appreciates my work but the problem is the shortage of drugs. Now when we hold awareness sessions, people ask us if we have ACTs. If we say no, they tell us that awareness is futile: “you invite us to give information and talk, but you don't even have ACTs, so why should we come?”” (Z1).

5. Discussion

CHWs involved in CCMm in Burkina Faso perceive most of the mechanisms associated with successful community-based interventions. In regard to the health care system, CHWs feel that they are part of it, accountable to its agents and supported by them. They consider themselves to be credible and legitimate health actors. In regard to their community, CHWs feel that they are closely related to it, that their social status has improved, and that villagers manifestly value their work. These mechanisms are related to key performance factors identified by numerous studies on CHWs (Alam et al., 2012; Bhattacharyya et al., 2001; Bhutta et al., 2010; Liu et al., 2011; Perry and Zulliger, 2012; Puett et al., 2013).

Two mechanisms are generally absent. First, even though CHWs feel responsible for the village's health, they do not consider themselves accountable to its members. Accountability to village members is an important driver for community participation and CHWs' service uptake (Gilson and Mills, 1995) and is recommended in community-based intervention planning (Bhattacharyya et al., 2001; Bhutta et al., 2010). Several factors explain the absence of

this mechanism in our study. First, none of the MEILUP components focus on CHWs' accountability to the community (Ridde et al., 2013). Second, most of the CHWs were automatically designated because of their past experience as CHWs; they were not elected from among several volunteers. In addition, hierarchy is omnipresent in Mossi culture (Ridde, 2008) and CHWs have equal social status than most of the village members (the chief excluded). Lastly, CCMm is time-consuming and generates little income; CHWs do not have much to lose – some say they would be happy to be replaced.

The second generally absent mechanism is precisely the sense of being valued by the health system. CHWs express the feeling that financial compensation is not equivalent to the importance of their work or the induced monetary losses. This corroborates several studies showing that inadequate remuneration is a common source of CHWs' dissatisfaction and attrition (Bhattacharyya et al., 2001; Brunie et al., 2014; Greenspan et al., 2013; Perry and Zulliger, 2012). In addition, the expectation of getting a salaried position in the future thanks to their CHW activities proved to be a motivating factor (Greenspan et al., 2013; Takasugi and Lee, 2012), but it was never mentioned in our study – probably because of their age and previous involvement in intermittent interventions that did not improve their condition. Non-monetary marks of regard given by nurses (invitations to health meetings, etc.) improve CHWs' feelings of being valued – such local initiatives deserve to be integrated in future CCM programs. However, it appears in our study that CHWs' sense of being valued may be enhanced only to a certain extent by non-financial incentives; in a context of extreme poverty, you cannot attach too much importance to a volunteer without making him/her challenge its financial condition (Greenspan et al., 2013; Takasugi and Lee, 2012). None of the CHWs mentioned that financial remuneration would weaken their relatedness to the community – an argument commonly advanced for not paying CHWs (Glenton et al., 2010).

5.1. Differences between sites

There were few differences between the two districts under study. One of them concerns the double chain of supervision of MEILUP (health system vs. NGOs), a characteristic that echoes recommendations from policy documents (WHO, 2005). In Kaya, the double chain of supervision was not an issue. In Zorgho, due to a local adaptation of MEILUP, NGO supervisors were involved in some activities normally performed by nurses (medical supervision, re-supply of drugs, etc.). This situation constrains CHWs' perception of accountability to the health system. While CHWs' double allegiance (to the system and the community) had already been identified as an issue (Standing and Chowdhury, 2008), our results suggest that the involvement of NGOs in CCM might further confuse CHWs and challenge their performance, especially if the involvement concerns medical tasks. Substitution of health authorities for NGOs in the implementation of health interventions has been documented in sub-Saharan African countries (Pfeiffer, 2003; Ponsar et al., 2011).

Another difference between the two sites is related to the presence of several concomitant interventions in Kaya district. The introduction of free health care for children under 5 in health centers considerably reduced uptake. This altered their perception of being legitimate and important health actors; however, it did not compromise that perception, thanks to the fact that adults continued to visit CHWs. This underlines the need to better integrate state- and NGO-driven interventions and promote the devolution of responsibilities to local health districts, as intended under the Paris Declaration (Spicer et al., 2010).

5.2. Factors influencing the presence of mechanisms

The analysis of factors related to the presence of mechanisms reveals 2 additional noteworthy elements. First, ACT stock-outs appear to represent a major barrier to several mechanisms, which tends to corroborate Kane et al.' hypothesis that a lack of systemic back-up is detrimental to CHWs' performance. ACT stock-outs have negative repercussions outside of CCMm sphere; they may by extension undermine CHWs' preventive activities, as other studies suggest (Chuma et al., 2010; Jaskiewicz and Tulenko, 2012; Stekelenburg et al., 2003). This is cause for concern since curative services take precedence over CHWs' preventive and health promotion activities (Druetz et al., 2014). To keep the population's confidence, CHWs may in response be tempted to adopt dangerous practices, such as administering antipyretics alone to febrile individuals. These elements support calls for carefully taking into consideration the needs of drug supply chain and the strengthening of local health systems when planning CCM interventions (Callaghan-Koru et al., 2012; Druetz et al., 2014).

The second striking element is the influence of the past on CHWs' current perceptions. Many similarities exist between MEILUP and previous interventions implemented in sub-Saharan Africa in the 1980s to manage malaria within communities (Hopkins et al., 2007; Perry and Zulliger, 2012). Our study suggests that CHWs struggle to renew the population's interest and confidence in their work; most of them were active in previous unsuccessful community-based interventions (Nitiéma et al., 2003; Sauerborn et al., 1989) and CCMm is not really innovative in comparison. According to CHWs, ACT efficacy is the element that makes the difference in the eyes of the population: "Actually, it is not me that they [the population] appreciate, but the drugs' efficacy" (K8). On the other hand, previous experiences as CHWs may help some mechanisms to be triggered, notably the sense of relatedness with the health system. The influence of past unsuccessful experiences on CHWs' performance has rarely been empirically studied (Bingham et al., 2012).

5.3. Challenges ahead

We agree with Glenton et al. (2010) that CHWs' performance depends on context-specific factors. This is problematic, since CCM interventions are not always adapted to the local context. The realist review used by Kane et al. (2010) is particularly appropriate in that it identified regular patterns in CHWs' dispositions to performance and forces us to look at this topic differently. As an example, despite numerous studies the evidence on the association between monetary incentives and performance is still inconclusive because of contextual interaction. Relying upon Kane et al.'s framework, what should be emphasized in studies is CHWs' sense of being valued rather than incentives independently associated with a concept (performance). The focus on CHWs' agency puts the context – including individuals' history – back in the center of the performance debate by raising the question of their ability to perform well in CCMm activities (Sen, 2001).

Challenges remain in using a realist perspective to understand CHWs' performance. On the one hand little is known about how the context influences the presence of such mechanisms. Our study suggests many contextual influences; for example, we found that in a context of extreme poverty, CHWs cannot feel adequately valued without some regular monetary remuneration. On the other hand, the empirical association between the presence of mechanisms, CHWs' performance, and the intervention outcomes remains to be studied. Our results suggest several links between the presence/absence of mechanisms and performance. For example, the perception of lack of back-up support and insufficient value

attached to their work by the health system discourage CHWs to carry on their activities. Realist evaluations of CCM programs are needed to further investigate the context-mechanism-outcome configurations suggested in this study (Pawson and Tilley, 1997).

5.4. Limitations

Some limitations must be mentioned. First, while the study area includes both urban and rural areas, all the villages that were included were relatively close (<15 km) to the city and/or to a health center. This may have boosted CHWs' closeness to health agents and reduced their sense of importance in Kaya, where most children have gone to the health center instead of visiting the CHW since user fees were removed. In addition, the presence of a Hawthorne effect cannot be ruled out because CHWs may perceive the mechanisms differently when they are not in an interview (Miles and Huberman, 2003; Olivier de Sardan, 2008). Presenting the results mechanism by mechanism may give the false impression that they operate independently while there is considerable overlap. It was also difficult to clearly separate the presence of a mechanism from its perception by CHWs. Triangulation with other sources of information (informal discussions with personnel at health centers, for example) was very limited, since mechanisms operate in CHWs' reasoning. The study investigated only the 7 mechanisms associated with health systems related interventions and interventions involving a better positioning of the CHW. Our results cannot be generalized to training interventions. Finally, data collection took place during a prolonged period of nation-wide ACT shortages. This may have amplified the weight of this factor in our results. However, located at the very end of the supply chain, CHWs are the most prone to endure stock-outs (Chandani et al., 2012). Drug shortages remain a major problem after the prolonged shortage, as a workshop we held in Kaya in November 2013 with CCM stakeholders confirmed.

6. Conclusion

CHWs are increasingly involved in case management strategies – notably in sub-Saharan African countries – but their performance remains a key challenge for such interventions because of contextual interactions. Our study is the first to empirically investigate the presence of 7 mechanisms previously identified as being associated with good performance in CHWs. We explored perceptions of CHWs involved in CCM in Burkina Faso. Most of the time, the 7 mechanisms were perceived by CHWs, except for the sense of being valued by the health system and accountability to the community. Several contextual factors were identified as having an influence on the mechanisms' perception, such as: health system deficiencies, lack of integration between governmental and non-governmental interventions, past experiences of CHWs, and overall socio-economic deprivation. Recommendations for CCM strategies should emphasize the need to take into consideration CHWs' perceptions of these mechanisms and adapt these strategies to the local context. Realist evaluations are needed to understand how these mechanisms interact with the context and the outcomes of CCM interventions.

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Abbreviations

ACT	Artemisinin-combination therapies
CCM(m)	Community case management (of malaria)
CHW	Community health worker
NGO	Non-governmental organization
WHO	World Health Organization

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.socscimed.2014.11.053>.

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