Are we asking too much? Addressing community health worker productivity

Increasing community health worker productivity: addressing the work environment

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Abstract

Background

Community health workers (CHWs) are increasingly recognized as a critical link in improving access to services and achieving the health-related Millennium Development Goals. CHWs are frequently called upon to address essential service delivery needs, and the number of tasks assigned to an individual CHW is steadily increasing. Given the financial and human resources constraints in developing countries, CHWs are expected to do more without necessarily receiving the needed support to do their jobs well. How much can be expected of CHWs before work overload and reduced organizational support negatively affect their productivity, the quality of services, and in turn the performance effectiveness of the community-based programs that rely on them? This article provides policy-makers and program managers with key considerations recommendations for a model to improving the work environment as an important approach to increase CHW productivity, and ultimately as an important contributing factor to the effectiveness of community-based strategies.

Methods

A desk review of selective published and unpublished articles and reports on CHW programs in developing countries was conducted to analyze and organize findings on factors the elements that influence CHW productivity, and provide recommendations for policy-makers. The search was not exhaustive but rather was meant to gather information on general themes that run through the various documents to generate perspectives on the issue and provide evidence on which to formulate ideas. After an initial search for key terminology related to CHW
productivity, a snowball technique was used where a reference in one article led to discovery of additional documents and reports.

Results

CHW productivity is determined in large part by the conditions under which they work. Key factor of organizational support and attention to the provision of an enabling work environment for CHWs is essential for achieving high levels of productivity. We present a model in which the work environment encompasses four essential elements—workload, supportive supervision, and supplies and equipment, and respect—that affect the productivity of CHWs. We propose that when CHWs have a manageable workload in terms of a realistic number of tasks and clients, an organized manner of carrying out these tasks, a reasonable geographic distance to cover, the needed supplies and equipment, and the support of an effective supervisor, and respect and acceptance from the community and the health system, they can function more productively within at least minimum standards of quality and contribute to an effective community-based strategy.

Conclusions

As more countries look to scale up CHW programs or shift additional tasks to CHWs, it is critical to consider the elements that affect CHW productivity during program design as well as implementation. An enabling work environment is crucial to maximize CHW productivity. Policy-makers, program managers, and other stakeholders need to carefully consider how the productivity elements related to the work environment are defined and incorporated in the overall CHW strategy. Establishing a balance among the four elements that constitute a CHW’s work environment—workload, supportive supervision, supplies and
equipment, and respect—will help to make great strides in improving the effectiveness and quality of the services provided by CHWs. All the productivity factors of workload, supervision, and supplies and equipment need to be considered concurrently. This article provides recommendations to improve CHW productivity and the quality of the services they provide.

Background

Community health workers (CHWs) are increasingly recognized as an integral part of the health workforce needed to achieve the health-related Millennium Development Goals [1]. CHWs are a critical link in increasing communities’ access to services, especially for those people living in rural and underserved areas. Accordingly, the Global Health Workforce Alliance commissioned a systematic review to gather the latest evidence on wide-scale use of CHWs followed by a consultation meeting in April 2010 to review recommendations and reach agreement on key messages for country-level integration of CHWs into the health workforce.

CHWs are frequently called upon to address a number of essential service delivery needs, including maternal and child health, family planning, HIV/AIDS, malaria, and environmental health. As task-shifting becomes more widely implemented, CHWs have more tasks piled on to their list of job responsibilities. A multicountry study noted “an evolution over time, whereby CHWs typically take on additional responsibilities and skills, which are learned on-site” [2]. Given the serious financial and human resources constraints in developing countries, CHWs are expected to do more with less, although they may not always receive the necessary support to do their jobs well, such as supportive supervision and supplies and equipment. There is still no resolution to the longstanding debate on the question of how many functions an individual CHW can realistically and effectively perform within their approved scope of practice [3, 4, 5, 6].
Naturally, there is a limit to productivity such that when the workload is pushed beyond a certain level, CHW performance will suffer. How much can be expected of CHWs before the workload overload and reduced organizational support negatively affect their productivity and the quality of their services, and in turn the performance-effectiveness of the community-based programs that rely on them?

Relatively little attention has been given to the issue of CHW productivity, although the “benefits of addressing productivity include greater efficiency, reduced workload, increased job satisfaction, and higher quality of care” [7]. As more countries and nongovernmental organizations incorporate CHW strategies into their health programs, the need for guidance on how to maximize investments in CHW programs in terms of productivity and its effect on quality grows.

This article provides presents policy-makers and program managers with guidance on the key considerations for a model to improving improve the work environment as an important approach to increase CHW productivity, and ultimately as an important contributing factor to the overall effectiveness of community-based strategies. It also recognizes the importance of supporting efforts to fully integrate CHWs as an essential component of the health workforce team. The paper asserts that a holistic approach requires changes to the system so that CHWs are well integrated as members of primary health teams, and this in turn will then provide the supportive climate for well-chosen productivity interventions to succeed.
For the purposes of this article a CHW is defined as a “worker that performs a set of essential…health services who receives standardized training outside the formal nursing or medical curricula and has a defined role within the community and the larger health system” [8].

**Methods**

A desk review of selective published and unpublished articles and reports on CHW programs in developing countries was conducted to analyze and organize findings on factors that influence CHW productivity. The search was not an exhaustive attempt to uncover all writings on the topic but was meant to gather information on general themes that run through various documents to generate perspectives on the issue and provide evidence on which to formulate ideas, and provide recommendations for policy-makers. After an initial search for key terminology related to productivity, a snowball technique was used where a reference in one article led to discovery of additional documents and reports to be reviewed.

This paper has a narrow focus on the elements of CHW productivity and does not explore links between productivity and the resulting performance of CHWs. A discussion on associations between CHW productivity and performance and a program’s impact on the health of the populations served by CHWs is beyond the purview of this paper.

**Results and Discussion**

Little has been published that specifically addresses the productivity of CHWs; most studies concentrate on the performance of CHWs or the overall CHW program or strategy. However, we can extrapolate from the theories and perspectives describing the productivity of facility-based
health workers. From an economic standpoint productivity is often defined as the ratio of outputs to inputs [10] or the ratio of what is produced to what is required to produce it [36]. These economic definitions of productivity have been translated for the health sector as the services provided by a health worker over a given period of time [37]. This paper borrows from the economic perspective to discuss some of the key requirements or inputs needed for CHWs to be productive in providing essential health services (outputs) to the communities they serve. A review of the literature presents a number of definitions for productivity ranging from the number of clients seen per day, time spent with clients [9], relationship between inputs and outputs, and ratio of outputs to inputs [10]. Very few studies focus specifically on the productivity of CHWs. However, we can extrapolate from the theories and perspectives describing the productivity of facility-based health workers.

For a CHW (or any health worker) to be productive a number of broad-based and interrelated inputs are required. A number of interrelated factors affect productivity. These include:

- Capacity (knowledge, skills, and attitudes)
- Motivation
- Organizational support or “opportunity to do the job well” (resources, physical and social environment, working conditions) [11, 12, 13].

While the capacity and motivation (both extrinsic and intrinsic) to do the work are also essential determinants of a CHW’s productivity, these are areas that have already been extensively covered in published literature. This paper will focus only on describing the third category of organizational support for with specific attention to the provision of an enabling work
An enabling work environment is a general term to describe the inputs or considerations needed from the institution employing CHWs and represents the conditions under which CHWs perform their duties. The working conditions—environment or working conditions—encompass four key elements: workload, supportive supervision, and supplies and equipment, and respect [38]—that affect the productivity of CHWs. This model of productivity is illustrated in (see Figure 1).

Figure 1.

“Working conditions, part of the broader human resources management system, are important in terms of creating the conditions for effective and efficient work, boosting morale, and reducing turnover and attrition” [14, 15]. Lack of attention to working conditions and human resources management is a key factor in the foundering of CHW programs [15]. One key message from the Global Health Workforce Alliance consultative meeting on CHWs emphasizes the need to “[e]nsure a positive practice environment, including regular and continuous supportive supervision, health and safety issues, CHWs information and communication needs, a clean environment, a manageable workload, and the availability of drugs, supplies, and equipment [16].”

When assessing CHW productivity, it is critical to pay attention to the quality of the target services. For example, if a CHW sees more and more clients but the services are rushed and of such poor quality that they have no effect, this would hardly be a case for improved productivity.
A study of the working conditions of health extension workers in Ethiopia found that most work long hours, including on Sundays [15]. Establishing a balance between the three subcomponents that constitute a CHW’s working conditions will help make great strides in improving the quality of the services provided by CHWs. When CHWs have a manageable workload in terms of a realistic number of assigned tasks and clients to serve, an organized manner of carrying out these tasks, a reasonable geographic distance to cover, the needed supplies and equipment, as well as the support and guidance of an effective supervisor, they can function productively within the limits of quality.

**Workload**

As described above, workload plays a defining role in the level of productivity and quality that can be expected of CHWs. Workload is a multifactorial concept that can be described by the interplay of the number and organization of tasks and the catchment area. The catchment area can be further divided into two equally important aspects: the number of households to be served and their geographic distribution (see Figure 2). To ensure a realistic workload all of the subcomponents must be considered in turn.

**Figure 2.**

**Number of tasks:** There is no known ideal or maximum number or mix of CHW job tasks that will ensure the highest level of CHW productivity. However, much has been reported both anecdotally and empirically regarding the consequences that too many responsibilities can have on CHW productivity and consequently on the quality of the services they provide. Evaluations
have reported that CHWs often become “overwhelmed by a very broad range of tasks with negative effects on the overall quality of their performance” [17]. A study of the working conditions of health extension workers in Ethiopia found that most work long hours, including on Sundays [15]. A qualitative study of lady health workers in Pakistan illustrated that the addition of responsibilities not in their job descriptions, such as involvement in polio eradication campaigns, loading and unloading of medicines, and transportation of stocks took valuable time away from their regular work [18].

Generalist CHWs, whose duties encompass a wide range of service delivery tasks, tend to have the heaviest workload in terms of the number of tasks they are asked to perform. However, this may not always be the case, especially for CHWs focusing on such specific yet comprehensive health areas as HIV/AIDS. A study of CHW contributions to HIV service delivery across five countries described more than 100 possible types of tasks divided across 12 categories of care, such as education, counseling and testing, follow-up, and psychosocial support [2]. The USAID-supported CHW Program Functionality Assessment Tool delineates a vast number of discrete tasks approved for CHWs within maternal and child health, reproductive health, nutrition, and HIV/AIDS, based on an extensive literature review of CHW scopes of practices from many countries around the world [19].

According to a literature review on CHWs, “despite the wide range of tasks that CHWs can do, they cannot do everything— their limited educational background and training mean that they can only be expected to perform a limited number of tasks that complement the work of health professionals” [20]. When there are too many tasks to perform CHWs may not perform them all
but instead select a few that they prefer to do, ones that they do best, or those that are most feasible [17]. In particular “unpaid volunteers must have a limited set of tasks and not be expected to work more than a few hours a week; otherwise they tend to abandon their responsibilities” [21]. A study on the role of health surveillance assistants (HSA) in Malawi showed that they do not perform all the tasks in their job descriptions, which include a plethora of activities such as vaccination, growth monitoring, disease surveillance, health education, tuberculosis follow-up, family planning provision, treatment for common diseases, and supervision of traditional birth attendants [22]. An assessment in Pakistan showed that lady health workers become stressed in their job because they have little say regarding their increasingly expanding job scope and are seldom consulted when their job description changes [23].

Figure 3 provides a graphical representation of the limitations of CHW productivity as a function of the number of tasks assigned on the quality of output. The quantity of services provided by CHWs can have an inverse effect on the quality of services delivered. In other words, the more services a CHW is expected to carry out, the more likely productivity will be hampered and quality of service provision will decrease.

Success is more likely when CHWs have a clear job description that defines a limited number of tasks [24]. CHWs can “perform better with clearly defined roles and a limited series of specific tasks than if they are expected to undertake a wide range of tasks or have an ill-defined role” [25]. Clearly defined roles, standardized protocols, and job aids should ensure that CHWs practice within the limits of what they can achieve and for which they have been trained [20]. In
Oman, where community support group volunteers have a limited job description, their coverage was high; 80% of women surveyed reported contact with the volunteers [20, 26].

Programs must “avoid over-burdening CHWs with competing priorities and expanding intervention” [25] without making concessions in other aspects of their work environment. For example, it may be possible to increase the range of services provided by CHWs if other adjustments are made such as reducing the catchment population, increasing their capacity with training, and providing stronger supportive supervision. Programs must carefully assess and monitor the workload of CHWs and its effect on CHW motivation and productivity as more tasks are added to a CHWs list of job responsibilities [5]. Monitoring and assessments of CHW programs should regularly include checking in with CHWs to obtain their feedback on program inputs and suggestions for improvements. Listening to CHWs is valuable to glean their perceptive insights on how their work environment can be organized for maximum productivity, and also as an intrinsic motivator.

Organization of tasks: Beyond the actual number of tasks assigned to a CHW, the organization of those tasks can assist in maximizing productivity. For example, if a task needs to be conducted only once or twice a year, such as providing deworming tablets, it does not have much impact on other tasks that are carried out on a more regular basis. Likewise, the manner in which CHWs are trained to carry out the various job tasks can influence productivity. For example, a modified version of systematic screening, used by facility-based professional health workers, could be
adapted to increase the number of services provided at a single client visit. In this way the CHW would use a checklist, questionnaire, or other job aid to ask the client about health areas within the CHW’s scope of practice, in order to identify the client’s needs and where possible provide all the services or information within that visit or refer to the next level. Multicountry studies (with professional health workers) have shown that systematic screening can increase the number of services received per client visit by 9 to 35% [9, 27]. The screening approach, if appropriately adapted for a CHW program, could increase efficiency by decreasing the number of visits to the households, preserving clients’ time, and reducing transport and other costs.

Another strategy is to integrate services provided by CHWs to meet the broader health service needs of the community. A survey of community-based reproductive health agents in Ethiopia found that integrated service delivery appears to increase the amount of time that agents must spend with each client [28]. Where productivity is defined as time spent with a client, this integrated delivery approach would increase productivity and possibly the satisfaction of clients and the quality of services.

**Catchment area:** The amount of work that a CHW’s catchment area entails depends also on the number of households each CHW is responsible for, the target group within the family (i.e., all family members, children only, women only), as well as the geographic distribution of those households. A critical question regards the optimal population size that a CHW could cover [29]. No set formula exists for the optimal number of households CHWs can feasibly serve with a minimum standard of care. There are countries such as Sri Lanka where a CHW covers as few as 10 households with maternal and child health services, while in India a CHW covers about 1,000
households (approximately 5,000 population, usually spread over five to 10 villages) [30]. The population coverage and the range of services offered at the community levels are vital in the design of effective CHW schemes, and it should be noted that the “smaller the population coverage, the more integrated and intensive the service offered by the CHWs” [29].

This can be graphically depicted as a productivity curve whereby the quantity of services assigned is a function of the size of the catchment area. As the number of households a CHW is expected to target in a community increases, the quantity of services they will be able to effectively provide to clients will diminish. Conversely, if a CHW has a small and focused assignment of households, they will likely witness an increase in productivity because the CHW will be able to fulfill a greater number of service needs in the same time period.

How far apart the households are, how much geographic area they cover, the type of terrain, and whether reliable transport is available all affect how well CHWs are able to meet their performance expectations. When catchment areas are too large, CHWs may have difficulty finding the time or transportation needed to visit all the assigned households [5]. As compared with facility-based providers who spend unproductive time waiting for clients [7, 9], CHWs log unproductive time getting to the client or arriving at the household to find the client absent. HSAs and senior HSAs in Malawi cover wide catchment areas, on average five to 10 kilometers for HSAs and 10 to 20 kilometers for senior HSAs [22]. Catchment areas where families live spread out over wide distances, with difficult terrain to cross, or where CHWs are not provided with appropriate transport increases the time spent on the road and decreases productivity. CHWs participating in the delivery of a community-based newborn care intervention package in
Bangladesh’s Sylhet District “attended less than 5% of all births because of their high workload, travel distances, and difficulty receiving timely notification of deliveries” [31].

**Figure 4.**

Programs must take care to monitor the catchment area assigned to CHWs to ensure that they can satisfactorily reach all the targeted members within the specified geographic area with a standard level of quality of care.

**Supportive supervision**

To be successful CHW programs require regular and reliable support and supervision [3, 4, 5]. Offering CHWs supportive supervision within the structures and functions of the health team demonstrated better outcomes [2]. Yet supervision is often one of the weakest links in a CHW program [3]. Quality of supervision matters a great deal: ineffective supervision contributes to low CHW morale and poor productivity [32]. The following are a few examples:

- Supervision of CHWs in Zambia’s Kalabo District did not have a positive impact on performance because the quality was poor and almost half the CHWs did not experience any benefit from the supervision visits [33].
- An evaluation in Nigeria found that the majority of CHWs were not engaging in such critical components of the primary health care program as home visiting due in part to inadequate or infrequent supervision [32].
- In a few of the CHW programs in the Global Health Workforce Alliance review, supervisors were formal health staff from the health services who may not properly understand the CHWs’ roles and may resent the additional task of supervision [1].
- In some evaluations that have documented weak supervision in national CHW programs, the CHWs do not even know who their supervisors are or what they can expect from them [34].

Many health professionals lack the background to provide a supportive environment for CHWs [25]. The traditional supervisory approach that most are familiar with is more of a bureaucratic exercise, often is of limited value, and relies on a “policing” function that solely penalizes workers. What is needed is a change toward a more participatory and enabling supervisory approach that helps CHWs identify their challenges and implement solutions, and even considers using alternative technologies such as mobile phones and peer-to-peer support to create a two-way flow of information and communication. The Joint Learning Initiative Paper on CHWs in Africa emphasizes the following proposals to strengthen the supervisory approach:

“Clear strategies and procedures for supervision and the activities with which supervisors will be charged should be well defined. The skills need to be taught so that health personnel, CHWs and community health committee members know what is expected of them as supervisors. Supervision should be taught to be undertaken in a participatory manner. Top-down mechanistic supervision emphasizes the social distance between supervisor and supervisee and leads to communication breakdowns and ultimately to program damage. The guidelines for supervision should include a list of supervisory activities. The most important element of supervision is ensuring the two-way flow of
information. It is also vital that the supervisor acts as a role model so that their behavior can be copied [34].”

A supervisory strategy that has been effectively utilized in some CHW programs such as BRAC’s Shasthya Shebikas in Bangladesh, is to assign CHWs with a higher level of training (Shasthya Kormis) to supervise the CHWs [39]. Unlike professional health workers, these supervisors can fully relate to the expectations, pressures, and context in which CHWs perform their duties as they themselves have experienced them firsthand. An added benefit to this supervisory approach is the effect that creating a career pathway can have on CHW motivation.

Supplies and equipment

In order to carry out their tasks effectively, CHWs need a regular replenishment of supplies, medicines, and equipment. Unfortunately, this is another weak link [3]. When the supply of needed materials is disrupted not only will productivity decrease but there may be other equally detrimental consequences, such as losing the respect of the community without which a CHW can rarely be productive.

In Pakistan, “poor supply caused embarrassment and made lady health workers suspect in the eyes of the community because they were accused of selling drugs and contraceptives in the market” [18]. CHWs need the trust of the community; when this is compromised CHWs become ineffective. In Kalabo District, Zambia, one of the two most important factors behind the dysfunction of the CHW program was the shortage of drugs [33].
The cost of travel is an important determinant of CHW effectiveness [35] and should be factored in when considering how the supplies, materials, and equipment that CHWs need will be replenished. For example, lack of transport prevented some HSAs in Malawi from covering some of the villages in their catchment areas and from obtaining drugs and other needed supplies from their respective health centers [22].

**Respect**

Acceptance, support and respect from both the community and the formal health system are essential for CHWs to be effective. While respect from the community is a key criteria for initial selection of CHWs—and indeed many CHWs are nominated by their own communities [1]—in large part the organization or formal health system engaging CHWs has the responsibility for ensuring that the initial acceptance and support is maintained. The continued respect that CHWs earn from the community relies on many factors over which the institution has a high degree of influence, such as:

- The respect given to CHWs by the health system, which can be characterized by how well the CHW contribution is accepted and understood by facility-based health workers. This oftentimes is defined by the degree to which facility-based health workers respond to CHW referrals. If community members perceive CHWs referrals are not respected, they may lose trust in the CHW and not seek further services or heed future referrals [40]
- Ensuring a reliable stock of medicines and other needed supplies, as described above.
- CHW competence, as defined by the knowledge and skills acquired through training as well as monitoring and follow up through supportive supervision. Community perception
of CHW knowledge, skills, and overall ability to help them with their health needs is important for inspiring their respect and acceptance of CHW services.

**The Work Environment: Interplay of Productivity Elements**

CHW productivity is influenced by a complex interplay of the four elements that comprise an enabling work environment—workload, supportive supervision, supplies and equipment, and respect. Appropriate incorporation of these elements in a CHW program provides CHWs with the working conditions conducive to doing their job more effectively.

However, there is scant empirical evidence regarding which element of the work environment is the most important, or the exact degree to which one element or a combination of elements has a larger or smaller influence on the overall work environment and in turn CHW productivity. On some level ensuring the appropriate work environment can be a balancing act and is quite program and context specific. For example, BRAC’s *Shasthya Shebikas* in Bangladesh have a broad set of job responsibilities to accomplish and yet are considered highly productive and effective in their work. [41, 42] *Shasthya Shebikas* cover 250-300 households within a small neighborhood in their villages, enjoy a high level of respect from the government health sector, and strong supervision by higher level CHWs (*Shasthya Kormis*), which includes going along on household visits to firsthand assess and support performance, monthly refresher trainings to update knowledge and problem-solve, and regular opportunities to restock drugs and supplies [1, 39]. It seems clear in this case that the CHWs’ workload does not impede productivity as the other enabling elements are abundant. What is unclear is which of these elements makes the most significant difference in the *Shasthya Shebika* program or which of the elements inter-relate the
most and practically predict the positive productivity outcome. Is high productivity due to the supervisory support or more so to the refresher trainings that foster competence and ensure monthly refills of needed supplies and thereby continued earning of the goodwill of the community? Is productivity bolstered more by the relatively limited geographical reach of households to cover, or from the obvious esteem of the health sector and facility-based health workers that raises the CHWs acceptance and respect in the community, which is then manifests in health-seeking behaviors? Or is it some combination of two or three of these factors or others? These are the types of questions that require further research to fully understand the determinants of CHW productivity.

On the other hand, in cases where organizational support may be lacking and the work environment is less conducive, one can envision how increasing the quantity of services a CHW is expected to carry out can hamper productivity and consequently the quality of service provision. Likewise, supportive supervision without provision of the needed drugs and supplies will be inadequate as CHWs will not have the tools to properly deliver their services and will lose the respect of the community. In the same manner limiting the quantity of expected job tasks to a manageable number while demanding an overwhelming geographical and household coverage will limit a CHW’s productivity. Conversely, if a CHW has a small and focused assignment of households within a limited geographical reach or is provided transport to more quickly and easily move across larger distances to reach target households, they may likely witness an increase in productivity because the CHW is able to fulfill a greater number of service needs in the same time period.
Recommendations

Based on our findings we propose the following recommendations for policy-makers, program managers, and researchers to contribute to increased CHW productivity:

- **Carry out further research on CHW programs recognized to be the most effective** to define the degree to which each component of productivity (including knowledge and skills and motivation, which were not discussed in this paper) and the interplay between them influences CHW productivity to determine which combination of elements is the most critical for overall CHW effectiveness.

- **Conduct operations research to begin to answer the question of how much of a workload a CHW can undertake before productivity suffers, and in particular to determine the ideal number or highest limit of tasks as well as target geographical and household coverage.**

- **Involve CHWs in the decision about whether to add new services to their portfolio and if so, which service delivery tasks would be highly demanded and most effective.**

- **Employ the observational technique of time-use studies to understand how CHWs use their time to carry out assigned duties and what obstacles they encounter to develop interventions for increased productivity and efficiency.**

- **Improve the supervisory system to support CHW performance and productivity, provide recognition and feedback, assist in problem-solving, and link CHWs to the formal health sector.** Seek CHW feedback on what is working and what needs to be improved in their support system or work environment.

- **Explore the feasibility of the use of mobile technologies to improve connectedness and communications with CHWs and as a complement to supportive supervision.** Mobile
phones can also improve in-service training opportunities as well as enable CHWs to more efficiently order needed supplies or refer patients.

- Ensure consistency in the provision of supplies, equipment, and transport fundamental to CHW tasks.

- Strengthen human resources management systems to facilitate a standard level of working conditions that enable good performance within a conducive work environment.

Conclusions

As more countries look to scale up CHW programs or shift additional tasks to CHWs, it is critical to pay attention to two critical factors: a) the overall system within which the CHW works and b) the elements that affect CHW productivity. Both must be considered in the design phase as well as throughout implementation of the program. There are five factors that will produce a system that is more likely to support CHW productivity: strong policy and leadership support, clarifying key elements of the role, engaging communities in all aspects of the CHW role, managing the CHW input effectively, and integrating CHWs into primary health care teams. An enabling work environment is crucial to maximize the productivity of CHWs. There is no one element that is more important than another. Rather, all the productivity factors of policy-makers, program managers, and other stakeholders need to carefully consider how the productivity elements of workload (number and organization of tasks, and number and distribution of households), supportive supervision, and availability of supplies and equipment, and respect need to be considered concurrently are defined and incorporated in the overall CHW strategy. Any combination of too many job responsibilities, extended catchment areas, lack of transport, interrupted supplies and equipment, and weak supervision can cause a reduction in CHW productivity levels. Each factor should not be considered independently of the others. For
example, supportive supervision without provision of the needed supplies and equipment will not be enough. Likewise, limiting the number of job tasks to a manageable number while demanding an overwhelming geographical and household coverage target will limit a CHW’s productivity.

Establishing a balance among the four elements that constitute a CHW’s working environment—workload, supportive supervision, supplies and equipment, and respect—will help to make great strides in improving the effectiveness and quality of the services provided by CHWs. When CHWs have a manageable workload in terms of a realistic number of assigned tasks and clients to serve, an organized manner of carrying out these tasks, a reasonable geographic distance to cover, the needed supplies and equipment, the support and guidance of an effective supervisor, and the respect and acceptance from the community and the health system, they can function more productively.

The following are recommendations for policy-makers, program planners, and researchers:

Understand the broader policy, leadership and management framework within which CHW programs operate and address the systems issues that affect CHW productivity.

Conduct operations research to determine the ideal number or highest limit of tasks as well as target coverage to ensure a maximum level of CHW productivity.

Involve CHWs in the decision about whether to add new services to their portfolio and if so, which service delivery tasks would be highly demanded and most effective.

Employ the observational technique of time-use studies to understand how CHWs use their time to carry out assigned duties and what obstacles they encounter to develop interventions for increased productivity and efficiency.
Develop and orient CHWs to time management and task organization guidelines for improved time usage and job efficiency.

Improve the supervisory system to support CHW performance and productivity, provide recognition and feedback, assist in problem-solving, and link CHWs to the formal health sector. Seek CHW feedback on what is working and what needs to be improved in their support system or work environment.

Explore the feasibility of the use of mobile technologies to improve connectedness and communications with CHWs and as a complement to supportive supervision. Mobile phones can also improve in-service training opportunities as well as enable CHWs to more efficiently order needed supplies or refer patients.

Ensure consistency in the provision of supplies, equipment, and transport fundamental to CHW tasks.

Strengthen human resources management systems to facilitate a standard level of working conditions that enable good performance.

Reward CHW productivity and performance via public recognition, increased compensation, bonuses, increased access to training, promotion or other appropriate means.

**Competing interests**

The authors declare that they have no competing interests.
Authors' contributions

WJ analyzed the results-collected reports and articles from the selective of the literature desk review and wrote the journal article. KT conceived of the study-idea of the paper and assisted in critical thinking and technical revision. Both authors read and approved the manuscript.

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**Illustrations and Figures**

Figure 1; Working conditions/environment as a key determinant of CHW productivity

Figure 2; Components of CHW workload

Figure 3; CHW productivity curve: service quality as a function of service quantity

Figure 4; CHW productivity curve: service quantity as a function of catchment area
Figure 1

Knowledge & Skills + Motivation + Work Environment = Productivity

Work Environment:
- Workload
- Supportive Supervision
- Supplies and Equipment
- Respect
Figure 2

CHW Workload

NUMBER OF TASKS

ORGANIZATION OF TASKS

CATCHMENT AREA
Number of Households
Geographic Distribution