Research Article

Evaluating the Teaching Methods of a Community Health Worker Training Curriculum in Rural Guatemala

Michelle Lightfoot1,2* and Daniel Palazuelos3,4,5

1Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, USA
2Harvard Medical School, USA
3Division of Global Health Equity, Brigham and Women's Hospital, USA
4Partners in Health, USA
5Department of Global Health and Social Medicine, Harvard Medical School, USA

Abstract

It has been well established that adequate and appropriate training is necessary for community health workers (CHWs) to effectively address the health care needs of their communities. We used qualitative analysis to evaluate a health-training curriculum in rural Guatemala in order to gain further insights into best practices regarding CHW trainings. Our results indicate that curricula aimed at CHWs should not only be participatory, but also varied and include in-class simulations as well as in-field observational teaching.

ABBREVIATIONS

CHW: Community Health Worker; iCCM: integrated Community Case Management; NGO: Non-Governmental Organization

INTRODUCTION

The idea of training individuals to serve as health workers in their community is not new, yet interest in the potential of community health workers (CHWs) to improve health system functioning and population health has resurfaced in recent years [1]. The new models for CHW programs reflect important lessons learned from previous missteps: tasks are more clearly defined, supervision and management structures are seen as essential pillars for program functioning, and best-practices in how CHWs can bridge communities to health systems is being actively studied [2].

The "integrated community case management" (iCCM) is one model that has gained international favor [1,3,4]. Acknowledging that CHWs are not a substitute for more highly trained medical care providers, this model provides CHWs with the training, protocols, and tools necessary to provide effective and timely care in the community setting for a limited number of high-burden diseases, and to refer to higher levels of care when needed [4]. The effectiveness of their work therefore depends not only on the work they do but also on the system that supports them.

Community health workers require effective and high-quality training in order to work successfully within these systems to have a positive impact on health of individuals and their communities [1,3]. Unfortunately, there is currently no clear standard by which this training should be conducted, and there is great variability in the type and duration of training that CHWs receive [1,3]. There has been even less research on how CHW trainees prefer to learn the material, or which teaching methods are most effective in improving their knowledge-base and confidence [3]. Working with community members recruited through a local non-governmental organization in Guatemala to serve as primary health care CHWs, in an expanded iCCM package common to many Latin American CHW programs, we sought to gain insight into the best practices of CHW training.

MATERIALS AND METHODS

Our project was conducted in collaboration with a United States based non-governmental organization (NGO) and another partner NGO in Guatemala. Founded by a group of Guatemalan civil war refugees, the Guatemalan NGO seeks to rebuild and revitalize their community through legal accompaniment and health promotion [5]. The Guatemalan NGO launched an effort where a small group of CHWs maintained basic pharmacies stocked with essential medicines, which were provided with funding through a separate Guatemalan NGO based in Chimaltenango. All of the CHWs were literate in at least Spanish. They lived in and served the communities surrounding Santa Ana Huista, Huehuetenango.
Study aim

We aimed to evaluate self-perceived changes in knowledge and confidence with the curriculum material in a small group of CHWs, as well as to determine if certain teaching methods were believed by the CHWs to be more engaging or more effective than others.

Recruitment of community health workers

CHWs were recruited through their prior work with the on-site organization. All community health workers were chosen by their communities to serve as the local CHW. In preparation for the training, all CHWs who had previously worked with the on-site NGO were offered the opportunity for further training. They were required to be available for the full training, and have voiced a commitment to continue to serve their communities in and around Santa Ana, Huitse.

Development and implementation of training modules

The topics addressed in the curriculum were chosen by the on-site organization based on feedback from the CHWs regarding the types of illnesses they most frequently face in their communities. These topics included: gastrointestinal anatomy and illnesses, respiratory system anatomy and illnesses, suturing and wound treatment, and women’s health including sexually transmitted infections. The topic of dosage and administration of essential medicines was integrated throughout all of the trainings. Please see (Table 1) for an example of the three and a half week curriculum.

A total of three and a half weeks were allotted for the training sessions. An Internal Medicine/Global Health faculty member and two student partners facilitated the training sessions. All were fluent in Spanish. The attending physician had many years of experience in CHW training through the international partner NGO. Both student partners had global health and community outreach experience.

Each training module was implemented using a variety of teaching methods based on training protocols previously developed and employed by the final author. These teaching methods included teach-back, small group presentations, role-play, didactic lessons, hands-on activities, and group and individual assessments (Table 2). Although previously developed iCCM materials were not used, all of the original materials developed were created in the same spirit of giving CHWs a limited number of powerful interventions that they could safely deliver in order to improve morbidity and mortality in their catchment area. All of the clinical skills taught were within the scope and standards of care practiced by other CHWs in Guatemala at the time of the study.

Evaluation of training modules

We used two qualitative measures to determine the impact of the training on the knowledge and confidence of each CHW: semi-structured interviews and post-training observation in the patient-care setting. Interviews were conducted once before beginning the training sessions, every day following a training session, and again at the conclusion of all training sessions. Table (3) shows example questions from the surveys conducted prior to and at the conclusion of the training, as well as the daily post-training surveys.

The interviews conducted prior to starting the trainings were to assess prior training received and each CHW’s baseline confidence in their ability to treat patients in the field. The daily post-training interviews aimed to assess a number of themes pertaining to the lessons of the day, including: the parts they felt were most useful, the activities they enjoyed the most, their impressions on how the lessons helped them learn, and how effective they were toward that end. The concluding interviews were to again assess confidence in treating patients in the field, comfort with explaining the topics covered to someone else,
Table 1: Overview of Curriculum.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Week 1: Respiratory</th>
<th>Week 2: Gastrointestinal (GI)</th>
<th>Week 3: Women’s Health</th>
<th>Week 4: Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro</td>
<td>Introductions and expectations</td>
<td>Review of respiratory anatomy</td>
<td>Teach back</td>
<td>Review GI/respiratory anatomy</td>
</tr>
<tr>
<td>Anatomy</td>
<td>Respiratory</td>
<td>Demonstration</td>
<td>GI</td>
<td>Group presentation</td>
</tr>
<tr>
<td>Health Topics</td>
<td>Chronic cough: allergies, asthma, reflux, tuberculosis</td>
<td>Didactic, Role Play</td>
<td>Diarrhea: viral, bacterial, parasites, amebic, worms</td>
<td>Demonstration, Group presentation</td>
</tr>
<tr>
<td></td>
<td>Acute cough: bronchitis, flu, pneumonia</td>
<td>Case Studies, Teach back</td>
<td>Appendicitis</td>
<td>Case presentation</td>
</tr>
<tr>
<td></td>
<td>Sinusitis</td>
<td>Case studies</td>
<td>Typhoid</td>
<td>Didactic</td>
</tr>
<tr>
<td></td>
<td>Otitis</td>
<td>Demonstration, Role Play</td>
<td>Gastritis</td>
<td>Case studies</td>
</tr>
<tr>
<td>Skills Sessions</td>
<td>Taking medical history</td>
<td>Role play</td>
<td>Preparing oral rehydration salts</td>
<td>Demonstration, Hands-on practice</td>
</tr>
<tr>
<td></td>
<td>Using stethoscope, breath sounds</td>
<td>Demonstration, Role play, Group discussion, Hands-on practice</td>
<td>Taking vital signs (blood pressure, pulse)</td>
<td>Demonstration, Hands-on practice</td>
</tr>
<tr>
<td></td>
<td>Evaluating for tonsillitis</td>
<td>Preparing oral rehydration salts</td>
<td>Injecting local anesthesia</td>
<td></td>
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<tr>
<td></td>
<td>Using oto-scope</td>
<td>Wound cleaning and suturing</td>
<td>Suturing</td>
<td>Hands-on practice</td>
</tr>
<tr>
<td></td>
<td>Antibiotic dosing</td>
<td>Didactic, Demonstration</td>
<td>Antibiotic dosing</td>
<td>Case studies</td>
</tr>
</tbody>
</table>

personal impression on how the training would affect their work, and personal opinion of which parts of the training they thought were the most and least helpful.

The observational component involved direct observation of the CHWs providing supervised patient care to members of their communities, and took place in two- to three-day intervals in each of the CHWs’ communities over the two and a half weeks subsequent to the trainings.

This study was conducted on-site by the first author and a student partner. The final author was on-site working with the Guatemalan partner organization, participating in the training and clinical supervision sessions, and helped to guide and edit this report. Video or audio recordings were not taken. Notes were reviewed together to look for common themes and clear trends. IRB approval was received from Harvard Medical School prior to the start of the study.

RESULTS AND DISCUSSION

Baseline demographics of the participating CHWs (Table 4)

There were a total of seven CHWs who participated in the training as well as in the study. At the time of this program's
Central Group Assessment: tools such as the Nicaraguan training book Buscando Remedio [10].

EXAMPLE: A patient case is presented to the group, beginning with the complaint of cough as the primary symptom. CHWs and facilitators discuss the notable features of the cough, other presenting symptoms, expected physical exam findings, and ultimately the plan of action for the patient. Multiple patient cases representing a range of respiratory illnesses that cause cough—such as allergies, asthma, gastroesophageal reflux, the common cold, pneumonia and tuberculosis—are discussed together. Conclusions are made about the key symptoms and physical exam findings that are useful in distinguishing between illnesses that require antibiotic treatment or referral to a health center vs. those that most likely represent a benign illness.

Case Studies: The facilitator presents facts about a theoretical patient, including their medical history, current symptoms, and physical exam findings. The group is then asked to make their own observations and suggestions, followed by their conclusions about the case.

Teach Back: Students take a topic they have previously learned and teach it to their peers. This may be done with a topic that students first learn in small groups and then teach to other students who have no prior knowledge of the given topic, or with a topic discussed with the group as a whole that is being reviewed. For example, the students are split into small groups, during which each group learns about a different health topic from the facilitator. Each group then teaches the other groups about their own topic. Alternatively, students all learn about the same health topic one day. They then individually review the topic for the rest of the class on a subsequent day in order to reinforce knowledge about that topic.

EXAMPLE: The CHWs are divided into small groups in which they learn how to use an otoscope or stethoscope. They are then paired with a fellow CHW and each individual teaches the other how to use the tool and conduct a part of the physical exam, under guidance of the facilitators. Another use of the method involves CHWs re-drawing and explaining key anatomy of the upper respiratory and gastrointestinal systems to their peers after learning the material the previous day.

Group Presentation: This is a form of teach-back. Students work together on a problem or task in a small group and then as a group teach the rest of their peers about the topic.

EXAMPLE: CHWs are split into small groups and facilitators review signs symptoms of one of several different illnesses such as allergies, pneumonia and the common cold. Each small group then teaches the entire class about the illness they discussed in their small group.

Interactive Didactic: The facilitator gives an oral presentation of a topic, which may be accompanied by demonstrations, explications, questions, examples, etc. This technique is most useful when the presenter is familiar with the topic(s) and understands the objectives of the activity. Emphasis is placed on making the sessions as interactive as possible.

EXAMPLE: Pasta and ketchup is used to augment a didactic about the differences between helminthic, bacterial and amoebic disease. A different type of pasta is used to represent varying gastrointestinal infections common in the community, with emphasis placed on the difference between the bacterial and amoebic organisms that can cause bloody diarrhea (those with ketchup) and the helminthic infections that usually do not. This helps to distinguish illnesses requiring only Oral Rehydration Salts (ORS), ORS and antibiotics, and/or referral to a health center. It also helps to counteract commonly held misconceptions, such as those about helminthic infections being a major cause of diarrhea, and realigns the CHWs understanding about the need for episodic deworming aimed at often mildly symptomatic or asymptomatic disease.

Demonstration: A topic or skill is demonstrated with the goal of facilitating observation and eliciting comments and explanation.

EXAMPLE: A water bottle is used to emphasize the concept of dehydration and the importance of ORS. A hole is placed at the bottom of a plastic bottle that represents the patient's gastrointestinal system. Covering the hole, the bottle is filled with water. This represents a patient in the healthy, hydrated state. When the patient becomes ill with a diarrheal illness, the hole is uncovered and water flows out of the bottle. CHWs note the loss of water and worsening dehydration of the patient. Adding ORS to the top of the bottle helps to keep the patient hydrated, but must continue to be added until the patient's diarrhea ceases, i.e., the hole is once again closed (Figure 1).

Group Discussion: CHWs work in small groups to solve a particular problem through discussion. A group leader is usually chosen in order to facilitate the discussion. It is a democratic technique that allows for attitude and behavior modification because participants discuss questions and draw conclusions among themselves. The expression of opinions allows students to confront ideas and complement distinct points of view about the chosen topic.

EXAMPLE: With assistance of a facilitator, more experienced CHWs lead a discussion of different illnesses, such as pneumonia or dysentery, which require antibiotics. The group also calculates the doses of appropriate treatment to understand the logic behind titrating a dose based on age or weight (though medicine doses in the field are more safely provided by standardized charts that obviate such calculations, available in reference tools such as the Nicaraguan training book Buscando Remedio [10]).

Group Assessment: Students work together to answer questions or solve puzzles aimed at assessing content knowledge of topics already covered in the training.
Central Lightfoot et al. (2016)

Email: mlightfo@bidmc.harvard.edu

EXAMPLE: CHWs are split into small groups of two to three people. They are given the same set of patient cases describing similar but distinct illnesses such as pneumonia, tuberculosis and influenza. The group works together to determine the diagnosis and preferred course of action for each patient. All trainees then come together to compare their answers and draw conclusions about the different illnesses.

**Hands-on Practice:** Students get to touch and see what they will be learning.

EXAMPLE: Students watch as a teacher dissects a rabbit in order to show general placement of organs as they relate to a human's body: heart, liver, intestines, etc. (FIGURE 2). Also, duct tape and foam sponges are used to imitate how wounds can be sutured.

**Individual Assessment:** Students work individually to answer written or oral questions about a topic previously covered in the training. This was most often employed in a written exam format.

EXAMPLE: Students are asked to identify key parts of respiratory or gastrointestinal anatomy, determine a diagnosis and course of action for multiple patient cases, and calculate dosages for medications commonly used in the field (or find the appropriate dose in a reference manual such as Buscando Remedio). Answers are discussed in a large group after the assessment.

<table>
<thead>
<tr>
<th>Table 3: Example Questions Training Surveys.</th>
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<tbody>
<tr>
<td><strong>Pre- and Post-Training Survey</strong></td>
</tr>
<tr>
<td><em>(Questions 1 and 2 asked only during pre-training survey)</em></td>
</tr>
<tr>
<td>1. Have you participated in Community Health Worker Training(s) previously? □ YES □ NO</td>
</tr>
<tr>
<td>2. If you answered &quot;Yes&quot; to question 1:</td>
</tr>
<tr>
<td>a. What type of training did you receive? Please specify the type(s) of activities you participated in:</td>
</tr>
<tr>
<td>b. What did like about the training(s)?</td>
</tr>
<tr>
<td>c. What did you not like about the training(s)?</td>
</tr>
<tr>
<td>3. For each theme during the training:</td>
</tr>
<tr>
<td>a. How comfortable would you feel explaining this topic to another person?</td>
</tr>
<tr>
<td>b. How comfortable would you feel treating a patient affected by this health condition?</td>
</tr>
<tr>
<td>4. What do you hope to gain from this training?</td>
</tr>
<tr>
<td>5. How do you think this training will help you better care for patients?</td>
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</tbody>
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**Daily Post-training Questionnaire**

1. Please choose yes, no, or neutral for each activity and topic. I think the activity was:
   a. Enjoyable
   b. Not enjoyable
   c. Will help me take care of patients
   d. Will help me recall information
2. What was your favorite part of the day? Why?
3. What was your least favorite part of the day? Why?

Implementation, their ages ranged from 19-55 years old. The majority had limited training in health topics and essential medication utilization and had only begun working in this capacity, but a few of the older CHWs already had extensive field experience from prior work.

**Outcomes in the classroom**

Feedback gathered from daily post-training interviews did not identify any one teaching method as being more or less enjoyable than others. Instead, each of the CHWs noted liking each of the methods at least once but usually multiple times throughout the training.

Although the CHWs reported enjoying all of the types of activities, all of the CHWs reported increased confidence and a perceived improvement in their ability to care for patients following the more interactive sessions, particularly the role-playing, individual assessments involving patient cases, and hands-on practice of taking vital signs and suturing sample responses are shown in (Table 5). For hands-on skills such as measuring blood pressure, all participants noted the importance of practice to learning new skills. The desire for supervision and assessment while practicing the skills was a consistent theme in the interviews, with five of seven of the CHWs specifically noting that they gained confidence through reassurance that they were performing the task correctly. Of note, the other two were among the more experienced CHWs who already had significant work experience (Table 4).

Though not reported as being more enjoyable, the majority of the CHWs (71%) mentioned the importance of small group work in their learning. In addition, review of prior material was cited as an important component of the training by all CHWs. Reasons cited for this included that one can: "learn more in small groups," learn from peers, contribute different things as individuals, and be forced to talk more without one person dominating the conversation.

**Outcomes in the field**

Observations during community visits revealed that performance on in-class assessments was not indicative of clinical competence at the patient bedside. Direct observations
by the first author of CHW-led consultations suggested a number of common themes: 1) the CHWs in our cohort that took more time to arrive at a clinical diagnosis in class were often more confident treating patients, and 2) the CHWs that showed the most enthusiasm in class did not necessarily demonstrate the same enthusiasm in engaging with sick patients who depended on their care.

LIMITATIONS

The lack of a comparison group and short time frame in which we conducted the training and study made it difficult to measure any absolute changes in CHW knowledge and did not allow for measurement of long-term retention of curriculum content. However, information from prior studies suggests that additional training over a longer period of time would lead to greater long-term retention than could be expected of a three-week training [3]. Intensive analysis of outputs and outcomes in the field, such as statistics on adherence to protocols and clinical outcomes, was not possible due to logistical limitations and the small sample size in this study. The high student-to-teacher ratio likely also contributed to the high rates of CHW satisfaction, though this is often not feasible in larger-scale programs.

CONCLUSION

Overall, our findings indicate that regardless of content, curricula aimed at CHWs should not only be participatory, but also varied. Didactic sessions are necessary for conveying key information, but should not be overemphasized as a teaching method since a greater level of confidence may be gained through more interactive methods. In addition, integration and interactive review of all material should be emphasized throughout the curriculum and through on-site training in the CHWs’ villages.

As described in the manual Participatory Learning & Action, and similar to the advice given by renowned educators Paolo Freire and the Hesperian Foundation, when working with adult learners such as CHWs, it is necessary to: have clearly stated goals of the training; make the training relevant to the roles the trainees serve; acknowledge and incorporate the experience and knowledge CHWs bring to the training; and incorporate new skills and knowledge through interactive and hands-on activities that have a clear relationship to the work the trainees will perform and that builds on knowledge they already have [6–9]. Our findings add a unique insight to these methodologies that, to the best of our knowledge, has not been previously described in the literature: it is the total sum of the pace and variety of the lessons that may amount to the greatest sense of accomplishment and satisfaction among participants.

Many CHWs have low levels of literacy and limited experience with formal training and education [3]. This approach, what we call “recurrent re-engagement” with the CHWs during the training sessions through varying educational styles and a focus on hands-on learning, is therefore of critical importance. This is because such an approach likely leads to improved engagement during trainings, which may translate into improved retention of new knowledge. In addition, we found that it is not only important to be clear and deliberate with the objectives of the training, but that trainers must also remain flexible in their training schedules in order to adapt training curricula to local constraints. All of this requires that the trainers also be trained on how to be effective educators, which requires another host of investments.

Table 4: Community Health Worker Demographics (n=7).

<table>
<thead>
<tr>
<th>Age (number of individuals in age group)</th>
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<tbody>
<tr>
<td>18-24 years</td>
<td>2</td>
</tr>
<tr>
<td>25-34 years</td>
<td>2</td>
</tr>
<tr>
<td>35-44 years</td>
<td>1</td>
</tr>
<tr>
<td>45-54 years</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 54 years</td>
<td>1</td>
</tr>
<tr>
<td>Average overall age</td>
<td>34 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender (%)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>43%</td>
</tr>
<tr>
<td>Female</td>
<td>57%</td>
</tr>
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<table>
<thead>
<tr>
<th>Prior training to become a CHW (number of individuals)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ETESC course by final author (DP)</td>
<td>5/7</td>
</tr>
<tr>
<td>1 Course outside of on-site org.</td>
<td>1/7</td>
</tr>
<tr>
<td>&gt;1 course outside of on-site org.</td>
<td>1/7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prior work as a CHW, self-reported (number of individuals)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2</td>
</tr>
<tr>
<td>Some (Less than 2 years)</td>
<td>2</td>
</tr>
<tr>
<td>Moderate (5-10 years)</td>
<td>1</td>
</tr>
<tr>
<td>Significant (Greater than 15 years)</td>
<td>2</td>
</tr>
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<table>
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<tr>
<th>Has pharmacy of essential medicines (%)</th>
<th>86%</th>
</tr>
</thead>
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CHW = Community Health Worker

*CHW = Community Health Worker
Table 5: Representative Quotations of Feedback Provided by Community Health Workers about Specific Teaching Methods.

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>Representative Quotations Regarding Specific Activities Perceived to be Most Useful</th>
</tr>
</thead>
</table>
| Role playing    | [Of the patient interview]:  
"Makes me less nervous and gives me confidence."  
"We all learn together. With two cases together it was especially helpful."  
"It would be better to do more."  
"[It’s helpful because] you then know what to do."  
"Without patients we can’t put what we learn into practice. It was good."  
"I felt really good knowing how to reach a diagnosis."  
"It was good to do it right."  
"With a patient [case], we have to identify symptoms, not just know about them."  
"I lose my fear of patients." |
| Teach back      | [Volunteer to re-teach topics from prior day]:  
"Reviewing is always helpful. Now I have more confidence."  
"If we forget, we have the review."  
"With review one learns more."  
"Review is good."  
"Review of all of the diseases. Took time to go over everything."  
"We learn from each other." |
| Hands on practice | [Suturing]:  
"It is good to do a lot of practice because you could do harm."  
"I just want more time to practice."  
[Taking vital signs]:  
"Was helpful because someone was checking the numbers."  
"You get better with more practice."  
"The information sticks when you know if it is correct or not."  
"It was good because we would not know what is right otherwise. Especially with blood pressures."  
"We need practice and need to know what’s right."  
"At first you don’t understand, but with practice [you do]." |
| Variability     | [Liked most]:  
"Everything because it was different and every disease has its own treatment and symptoms and diagnosis."  
"I liked everything, a combination of theory and practice."  
"Everything is important and I like everything... It’s very dynamic."  
"Everything is perfect, I liked everything."  
"Everything worked well. Everything because it’s important."  
"I liked all of the activities."  
"I liked everything because it’s all very different. It is dynamic with people passing up to the board.”  
"There’s variety. Participation, practice and theory.”  
"There isn’t one thing that’s worth more than another...Everything is interesting.”  
"Everything is important and needed to learn better.”  
"More with marker if we are getting sleepy, more active stuff.”  
"I liked everything because we were learning different things.” |

In addition, CHWs must not only learn the material, but must also develop the confidence to employ the knowledge gained in situations where they will likely have far less direct guidance. This necessitates that curricula focus on the use of teaching methods that best promote confidence and learning among trainees. When CHWs are being asked to perform medical tasks, albeit basic, our experience suggests that using an apprenticeship model, similar to how other care providers are best trained, is also advantageous. This includes both in-class simulations (especially role-playing and hands-on practice) that allow peer CHWs to model best behavior at the bedside, as well as in-field observation of CHW behavior with direct feedback on how to improve performance. Either trainers or supervisors could likely perform these observation sessions.

With the renewed interest in expanding and integrating CHWs into health delivery systems [1], there is also more attention being paid to how the length and type of training may influence their potential impact [3]. We hope that our work will lead to improvements in CHW pedagogy by highlighting the value of variability of teaching methods, and on the importance of understanding the CHWs’ subjective experience of learning. Larger studies are needed to evaluate CHWs’ preferred methods of learning and to verify our findings. More research is also needed to assess knowledge retention following trainings, as well as whether the use of a variety of teaching methods actually translates to improved information retention, confidence in the field, CHW performance, and adherence to protocols. Lastly, future research needs to address how differences among the backgrounds and experience CHWs have at training onset, including age, prior work in the field, gender, socio-economic status, and education level, might also affect the methods perceived to be of most utility.

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REFERENCES


