Supervising Illiterate Community Health Workers in South Sudan to Deliver Integrated Community Case Management Services for Newborns and Children

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Abstract

Improving and maintaining the clinical skills of frontline health workers over time is critical for strengthening health systems and providing adequate care to mothers, newborns, and children—supervision is widely recognized as a key to improving health worker performance. In Warrap State, South Sudan, a 13-month study was undertaken to describe and assess a supervision model for illiterate community health workers (CHWs). CHWs were trained, supervised, and studied to assess correct use of newborn and child health record forms; identification, classification, treatment and referral of disease. After the supervision period, 87% of CHWs were accredited as competent to deliver Integrated Community Case Management plus essential newborn care services (iCCM Plus), with 95% of registration forms completed; 7% of discrepancy between classification of illness and drug administration, and all drugs accounted for with complete stocks. A total of 2,552 children under age five were seen by CHWs, with a mean of 196 child visits per month. The overall referral initiation rate to primary health care unit found was 73%, with 92% referral completion rate. Program results showed CHWs to be effective in improving coverage of key MNCH practices, assessing mothers and children, and initiating treatment for malaria and diarrhea. Results indicate that a supervision process to monitor, improve and maintain clinical skill performance by CHWs within a community case management strategy, is an important element of program design and implementation to obtain health outcomes, especially among community-based approaches where treatment with drugs is included and in fragile state context.

1 Introduction

1.1 Global Problem

Improving and maintaining the clinical skills of frontline health workers over time is critical for strengthening health systems and providing adequate care to mothers, newborns, and children. Supervision is widely recognized as key to improving health worker performance (WHO, 2006; Bosch-Capblanch and Garner, 2008), yet is one of the most challenging program elements to implement (Crigler, 2013). As millions of dollars are invested in community health workers (CHWs) to bring health coverage to underserved populations, it becomes important to understand the strengths and limitations of supervising these frontline health workers to build capacity and ensure quality care is provided.

During the primary health care movement of the 1970s, supervision approaches were top down, focusing mostly on the system's information requirements and less on the health provider's own needs (Marquez & Kean, 2002). Additionally, they aimed at linking the remote health worker to the formal health system as well as strengthening their limited health competencies (Clements et al., 2007). Recently, supervision models in the health sector, albeit with the main focus on the facility-based professional rather than community-based resources, have been replaced by an approach termed supportive supervision, which focuses on provider needs and support to solve provider problems. Supportive supervision has been defined by Cliger, Gergen, and Perry (2013) as "a process of guiding, monitoring, and

coaching workers to promote compliance with standards of practice and assure the delivering of quality care service. The supervisory process permits supervisors and supervisees the opportunity to work as a team to meet common goals and objectives."

Currently, there is a dearth of literature on supervision approaches, especially when referring to frontline health workers based at the community level. The inadequate number of skilled health personnel in developing countries, and the urgent need to cover vulnerable populations with essential health services through the utilization of community-based services, makes the documentation of lessons learned a vital contribution to continual efforts for improved child and newborn healthcare.

A first step in defining the intervention was a literature review that included nine peer-reviewed publications and six institutional reports,[1] which looked at the selection, training, and supervision of CHWs. Key themes emerged, notably that: 1) CHWs should be selected by their community rather than recruited (UNICEF, 2004), 2) culturally appropriate approaches to training, including the use of storytelling, should be utilized (USDHHS, 1998), and 3) supervision is "among the weakest links in CHW programs," (Lehmann and Sanders, 2007). The design of the intervention took into consideration key themes from the literature review, including the selection process of CHWs, design of the project training and tools, and a focus on supervision.

In addition, in-depth interviews and focus group discussions were held with mothers of children under two, community leaders, CHWs, Maternal and Child Health Transformation (MaCHT) project staff, Ministry of Health officials, and other stakeholders during the operations research (OR) preparatory phase to further inform the design of the training schedule and documents, with particular attention to language and literacy barriers.

1.2 Area Problem

The greatest barrier to health care in South Sudan is the lack of skilled human resources. Warrap State, with 64 percent of its population living below the poverty line, is one of the poorest states in South Sudan. Furthermore, the literacy rate of the 15years and above population is significantly lower in Warrap State than the national rates of South Sudan (16 percent in Warrap versus 27 percent nationally).[2] More than nine out of 10 of its population lives in rural areas, with a population density of only 21 people per square kilometer. Currently, humanitarian agencies provide more than 85 percent of all health care in the state.

Given the anticipated time it will take to adequately increase capacity within the formal health system in Warrap State, there is an urgent need for rapid deployment of community-based health services with proven competencies to deliver essential health care to children under 5, including newborns. Capacity building strategies like training and supervision need to be adapted, based on local context, to ensure skill-related transference and maintenance over time, thereby improving coverage and competence of CHWs.

1.3 Study Objective

The objectives of this study are to describe and assess a supervision model for illiterate CHWs providing care to mothers, newborns, and children in Warrap State, South Sudan.

[1] WHO (4), USDHHS (1), UNICEF (1)
[2] National and state Educational Statistical Booklet, EMIS, Ministry of education (2009)

2 Methods

2.1 Study Design

This study[3] uses a descriptive case study design. Multiple methods were used to conduct this assessment, including observations of CHWs and data collected from the supervision check-lists. These data were collected during the supervisory visits by the field supervisor and reported to a central supervisor.

The population for this case study included 15 home health providers, who are the frontline volunteer CHWs in South Sudan; one field supervisor; and one central supervisor.

During the recruitment phase, potential participants were informed that the information collected during the supervision visits would be used to inform a final project report, and verbal informed consent was received. Data was collected from March 2013 to March 2014.

2.2 Intervention

2.2.1 Project Training Tools

Project tools, translated into Dinka, the local language, used pictures and symbols to "cue" illiterate CHWs. An 11-page non-consumable flipchart (Annex I & II), used front to back, was designed to help CHWs systematically assess children for signs of illness (danger signs, iCCM, illness, and, when appropriate, newborn care) and deliver the appropriate response: home treatment, referral to a health facility, or urgent referral to a health facility. The flipchart was based on the WHO's Integrated Management of Childhood Illness (IMCI) algorithms (WHO, 2006), which are decision-making trees for detection of newborns with problems at routine home visits and referral of children and infants with severe problems to a higher level facility and those with simple conditions for treatment at the primary care level.

A corresponding newborn or child health recording form (Annex III & IV), with pictures to circle for findings and responses, was kept by the CHW for supervision purposes, while a corresponding referral form (Annex V) facilitated communication between CHWs and health facilities regarding signs observed and responses taken.

2.2.2 Community-Based Supervision Model

World Vision United States (WVUS), in collaboration with World Vision South Sudan and the Government of South Sudan Ministry of Health (MOH), piloted an innovative supervision model focused on community resources within an iCCM-Plus implementation program. The WVUS community-based supportive supervision model (see Table 1) utilized a three-function interactive model, originally designed for supervision of clinical activities. In this model the supervisor and supervisee are jointly responsible for completing supervision of formative (increasing skills and knowledge), normative (enhancing accountability and quality assurance) and restorative (facilitating collegial and supportive relationships) activities (Proctor, 1987; Jones, 1996; Cutliffe & Proctor, 1998).

The three-function supervision model shown in Table 1, illustrates the roles of both field supervisor and central supervisor for all components of the supervision: formative, normative, and restorative.

[3] This study was embedded in a four-year USAID Child Survival and Health Grant Program project (CSHGP), implemented by World Vision (WV) in South Sudan.

Formative supervision aimed to improve instruction, skills development, and knowledge retention. During formative supervision, the central supervisor was present throughout the training period and the field supervisor managed weekly visits. The weekly visits during this stage included individual coaching with each CHW as specific problem areas arose and were identified. Additionally, the field supervisors directed monthly group meetings that included continuing education for CHWs.

Normative supervision addressed skills and equipment management by continuing to engage both the central and field supervisor to ensure that "the supervisee's work is professional and ethical, operating within whatever codes, laws and organizational norms apply" (Proctor, 1987). Weekly and monthly visits by the field supervisor included coaching and reinforcement of technical tasks. The coaching involved identifying any problems in service delivery the CHW had during the previous week and jointly looking for a solution. The field supervisor tested CHW knowledge and practices by selecting a component of the flipchart for the CHW to competently explain, reviewing the CHW's records and forms for accuracy, and checking the medications and equipment used by each CHW. Normative supervision on the central supervisor's part entailed reviewing weekly reports submitted by the field supervisor and providing immediate feedback.

Restorative supervision aimed to support, reduce burnout, and improve satisfaction among CHWs. This component accounted for the positive feedback from the community and health facility via the field supervisor during weekly visits and monthly meetings. Additionally, the central supervisor was responsible for weekly teleconferences, dissemination of information, on-site support, and the collaborative assessments of problems in practice. At the end of the three-month training period, supervision visits were held on a monthly basis using similar approaches and tools, and discontinuing the role of central supervision.

Table 1: Components of a three-function interactive model used during the operational research intervention component of MaCHT

	Field Supervisor and Supervisee	Central supervisor and Field Supervisor
Formative	Weekly visits during three-month training period: FS coaches each Supervisee when problem areas are identified and Supervisee has opportunity to ask questions. FS plans continuing education topics at monthly group meeting (e.g. vaccination) Monthly visits after training period	Three-month training period Suspended after training period
Normative	Weekly visits during three-month training period: FS tests supervisee on components of the algorithm, checks recording forms and condition of medication/equipment. Monthly visits after training period	Review of weekly reports with immediate feedback. Suspended after training period
Restorative	Weekly visits during three-month training period: supervisee discusses successes and challenges with FS, and FS reports positive feedback from community and health facility. Monthly meetings.	Weekly teleconference, sharing of information, on-site support. Joint identification of solutions to problems in practice. Suspended after training period

The frequency of supervision visits was done on a weekly-basis during the first three-month post-training period, and then monthly for the rest of the implementation project. The first

phase of the supervision (first three-month period) was considered as part of an on-the-job training approach, considering educational level of participants.

2.2.3 Procedure

In the trial intervention area, the supervision model was implemented to support CHWs after iCCM-Plus training. The supervision model included: 1) a one-day workshop in February 2013 to train a project-hired supervisor and district MOH staff (as observers) on the supervision model and establish a central supervisor (supervisor of supervisors); 2) a reproducible supervision check-list, to be completed by the field supervisor for each individual supervisory visit; 3) the field supervisor tabulated information for submission to the central supervisor; and 4) the reporting structure (supervisee to field supervisor; field supervisor to central supervisor). All components were implemented together, and all were designed or adapted at WVUS headquarters and pre-tested at the field level with subsequent modification based on input from field staff and district MOH personnel.

During the intervention design and implementation phase, no government guidelines for the supervision of CHWs existed. The supervision model structure was based on the development of a CHWs task-flow, and includes the appointment of a single supervisor at field level to whom supervisees are accountable (15 CHWs to 1 supervisor) and establishment of a central supervisor based at headquarters level.

Supervision of CHWs for the first three-month training period, which included a five-day iCCM-Plus training, encompassed weekly supervision visits and reports submitted to the central supervisor, and weekly virtual conferences between field supervisor and central supervisor. From June 2013 to March 2014, the approach moved to a frequency of monthly field supervisory visits to each CHW, monthly field supervision collection of information, monthly field reports, and cessation of central supervision activity.

2.2.4 Intervention Training

The five-day iCCM-Plus training began with an individual verbal pre-assessment of CCM knowledge, recorded by trainers, after which the algorithms for classification of and response to general danger signs, pneumonia, diarrhea, and malaria were presented. Teaching each section involved five components: 1) sharing personal experiences, 2) using the pictorial flipcharts to illustrate each symptom, 3) group discussions, 4) viewing UNICEF/WHO videos for each symptom, and 5) using the corresponding sections of the registration and referral forms.

CHWs were taught to use pictorial cues to assess for signs of illness, such as this one, meaning "cough."

After each disease management topic, a field practicum was performed in a nearby village, with four CHWs and one supervisor traveling as a group. A significant amount of time was spent on the skill of using counting beads and a one-minute timer (WHO/UNICEF) to assess breathing rate. Although this training method was time-intensive, within five or six attempts, the women were able to successfully use this method. At the conclusion of the CCM portion of the training, a post-assessment was conducted and compared to the pre-assessment results. Of particular note, the question "How can you tell if a child has fast breathing?" was answered by almost all participants as "You can tell by looking" during the pre-test, and "Count the breaths for one minute" on the post-test.

The remaining sections (breastfeeding, immunizations and vitamin A, essential newborn care, newborn resuscitation, and newborn general danger signs) were excluded in the field practicum. These were included in additional interactive classroom trainings that included several hands-on practice sessions with aspirators and bag-valve mask resuscitators on newborn simulators.

Training culminated in a station-based test of five skills: completing the recording and referral forms, demonstration of management of fever, cough, and diarrhea according to iCCM-Plus training, and newborn resuscitation. Each CHW was assessed at each station, and only those CHWs who demonstrated understanding in all five received a field kit with forms, drugs, and equipment.

2.2.5 Supervision Checklist

The field supervisor's weekly checklist (Annex VI) included quantifiable measures of performance to assess CHW practices and case load. The checklist included 26 variables. The tool focuses on four main competency components: consistent and complete use of the registration form (seven questions); correct identification and classification of disease, according to an IMCI-modified algorithm (four questions); correct treatment of sick children according to classification, including medicine administration and referral (nine questions); and correct use and storage of tools and medical supplies, such as flip-chart, breath counter, bag and mask resuscitator, and aspirator (six questions).

2.2.6 Data Collection and Analysis

Information was prospectively collected through an ongoing monitoring system carried out by the field supervisor. Sources of information included monthly virtual meetings, monthly supervision field reports, and data collection from a supervision checklist and individual CHW child or newborn health recording forms. Data collected between March 2013 and March 2014 through monthly meeting reports, supervision checklists, and supervision individual reports were summarized.

3 Results

All CHWs (n=15) were female, illiterate, and chosen by their communities to participate in the project. All participated in a five-day training-workshop on service delivery of integrated community case management (iCCM-Plus[4]) tools. After the training-workshop the CHW accreditation rate[5] (based on four competency testing: demonstrated understanding of algorithm; demonstrated completion of registration form, demonstrated completion of referral form, and correct treatment according to classification of illness) was 60 percent (9/15), which increased to 87% (13/15) after 12 weeks of weekly follow up (supportive supervision). Two (13%) CHWs were discontinued from the project after this period of time due to inability to demonstrate acquisition of clinical competencies to deliver iCCM-Plus services.

During a 13 month period (March 2013-March 2014), trained CHWs provided health services to 2,552 children under age five, with an average of 196 children seen per month. The smallest number of children attended in a month was 76 during March 2013, and the highest was 378 child visits during August 2013 (see Figure 3). The time period in which the highest

[4] iCCM curriculum addresses diarrhea, pneumonia, and malaria in children. iCCM-Plus includes an additional component on newborn care. iCCM-Plus is the training received by the 15 CHWs in this OR project.
[5] Accreditation was considered when a CHW was able to demonstrate all pre-defined competencies to provide iCCM-Plus care

number of children were attended by a CHW (49 percent of total children attended during July-September period) correlates with the seasonal floods during 2012, as well as with the seasonal peak for malaria cases in South Sudan.

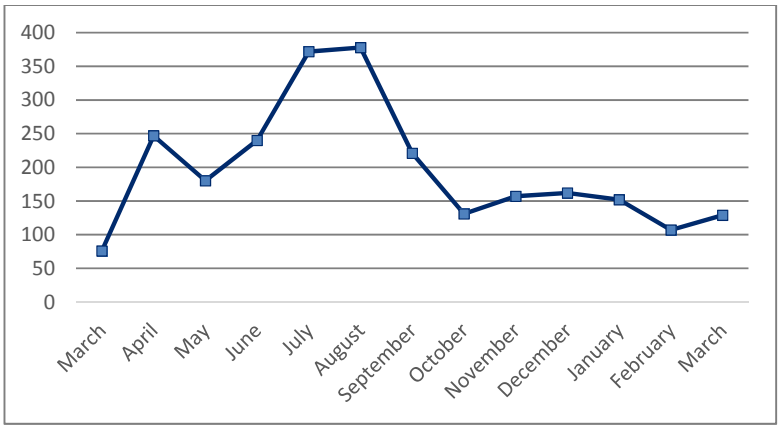

Figure 1.Frequency of children visited during a thirteen-month period, March 2013- March 2014. Kuac South, South Sudan.

Eighty-two percent (n=2,082) of children seen by CHWs were in the 1-59 months age group. A health problem was identified in 94 percent (n=1955) of these children. The most common cause of consultation in this age group was cough or difficulty breathing (41 percent), followed by urgently referred fever (39 percent), diarrhea with dehydration (5 percent), and general danger signs (2 percent). The remaining 18 percent of children (n=470) attended to by CHWs were in the newborn age-group (0-28 days after birth). A health problem was identified in 33 percent of this age-group. The most commonly classified disease was urgently referred fever (15 percent), followed by diarrhea with no dehydration (13 percent), cough or difficulty breathing (12 percent), and danger signs (4 percent). During this period, the overall trial referral initiation rate[6] was 73 percent (1854/2552), with a 92 percent (1712/1854) of referral completion rate[7].

By applying WHO's formula to calculate beneficiary coverage capacity, we were able to calculate the number of children that each CHW is able to provide health services per year. The Average Total Population Coverage Capacity (ATPCC)[8] per CHW found was of 98.1 children under 5 years of age per year. Each CHW is investing approximately two hours per week for a total of 65 hours per year.

Supervision results: during the 13 month period, there was a 75 percent completion rate for supervision visits (232 out of a target of 310 target supervision visits). The intensity of supervision was higher during the first three months post-iCCM training (weekly visit), with a monthly supervision visit thereafter. The supervisor/supervisee ratio utilized was 1:10. The registration form completion rate found among supervisees was 92 percent, with seven percent discrepancy between classification of illness and treatment administered. There were

[6] Referral initiation: proportion of clients seen that is referred to another level of service

[7] Referral completion: proportion of referred clients that completed the referral

[8] Calculation of the population coverage capacity is adapted from the WHO formula used to calculate population coverage capacity for health centers. Taking into account the total population of children under 5 covered (2,552 children) and an average of 236 working days per year, the CHWs saw an average of 10.8 children under the age of 5 per day. With 13 CHWs, this averages to each seeing 0.831 children under the age of 5 per day

no stock-outs reported or found during supervision visits and all drugs and equipment were found to be well stored and protected from sunlight.

4 Discussion

This study demonstrated that in a context where more than 8 of every 10 people is illiterate, such as Warrap state in South Sudan, well supervised, supplied and trained illiterate CHWs were able to deliver essential health interventions to children under 5, including newborns. The high CHW accreditation rate obtained during the intervention period suggest that quality of training and ongoing mentoring are appropriate given the level of formal education among participants. This feeds into the argument that formal education may not necessarily be a predictive criteria for performance among community health workers (Bajpai and Dholakia, 2011).

Despite a1:10 ratio of Supervisor per CHW, only three quarters of targeted supervision visits were accomplished, questioning the feasibility of using higher ratios for functional supervision systems at community level. One aspect demonstrated during the trial was the importance of establishing a supervisor-supervisee ratio based on contextual variables such as population density, transport availability, and road conditions.

Results from this intervention suggest that a supportive supervision process integrated into a training methodology, for the transfer and maintenance of CCM-related skills and competencies is an important element of program design and impact. This approach becomes especially relevant among community-based approaches where drug treatments are included, and in a fragile state context where a rapid response is required from the system. Findings during the trial clearly identify supportive supervision, especially during the immediate period after training, as a key step to ensure skill and competency acquisition, and not only as a management process to oversee a check on a person's work.

It is important to note is that all tools for this training were based on a picture-cueing system. All of the CHW participants were illiterate, necessitating hands-on and pictorial training methods. Illiteracy also proved to be a factor regarding difficulty with or ability to hold the paper in the correct direction, turn pages in the flipchart, and control a pencil to make circles around pictures. The CHWs were not at ease holding several paper items in their hands, and transitioning from turning a flipchart page to marking the form was a new skill. These very basic challenges slowed the training pace considerably, but were balanced by the amount of practical knowledge known by the CHWs from previous training and experience.

Most past studies focused on supervision have focused on clinical staff of formal health systems, mostly neglecting testing supervision approaches for community-based programs. To our knowledge, this is the first attempt to design, assess, and document a supervision model for community approaches using the three-function interactive model. The present report focused on competency and skill outcomes during a 13-month period, thus outcomes related to motivation and sustainability have not been included.

4.1 Study Limitations

The main limitations found during the implementation of this type of supervision were related to resources (fuel, transportation, communication at field level), geographic and environmental challenges (river, distance, rainy season), and institutional limitations (unclear lines of communication between field and headquarters). Additional limitations were related to the fragile state context currently affecting South Sudan—notably, high turn-over of project staff, and restrictions of movement of project staff and goods. Due to the small

sample included in the trial, extrapolations external to the area of project influence are not feasible.

5 Implications and Recommendations

This study report shows that close, supportive supervision immediately after training activities might be a key step to consider in ensuring skill and competency acquisition among illiterate CHWs in developing countries in a fragile state situation where CCM approaches are currently being considered or implemented. While this is primarily a descriptive study of a CHW supervision model, future studies should focus on assessing the competency, coverage and effectiveness of illiterate CHWs with supportive supervision compared to a control group to increase internal validity of the conclusions. If volunteer CHWs can provide quality care and improved access to care in developing countries in a highly cost-effective manner as supported by evidence-based research, their place in health care system structures can be formally established.

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7 Annexes

I.	CCM Pilot Manual Flipchart – English	 WV MaCHT CCM Pilot Flipchart pt.pp
II.	CCM Pilot Manual Flipchart – Dinka	 CCM pilot flipchart (Dinka).pdf
III.	Newborn Health Recording Form (0-28 days)	 CCM Newborn Form - revised with
IV.	Child Health Recording Form (29 days to 5 years)	
V.	Referral and Urgent Referral Form to Hospital or Health Center	 CCM Referral Form updated - A4.docx
VI.	Weekly Checklist for OR Supervisors	 Weekly Checklist for OR Supervisors -
VII.	CHW Training Timetable	 Training_Timetable_ CHW_HHP.docx
VIII.	CHW Skills Certification Test	
IX.	List of Equipment and Drugs for HHPs	 List of Equipment and Drugs for HHPs
X.	MaCHT Field Stories	 MaCHT Field Stories.docx