Data reporting constraints for the lymphatic filariasis mass drug administration activities in two districts in Ghana: A qualitative study

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Abstract

Objectives: Timely and accurate health data are important for objective decision making and policy formulation. However, little evidence exists to explain why poor quality routine health data persist. This study examined the constraints to data reporting for the lymphatic filariasis mass drug administration programme in two districts in Ghana. This qualitative study focused on timeliness and accuracy of mass drug administration reports submitted by community health volunteers.

Methods: The study is nested within a larger study focusing on the feasibility of mobile phone technology for the lymphatic filariasis programme. Using an exploratory study design, data were obtained through in-depth interviews (n = 7) with programme supervisors and focus group discussions (n = 4) with community health volunteers. Results were analysed using thematic content analysis.

Results: Reasons for delays in reporting were attributed to poor numeracy skills among community health volunteers, difficult physical access to communities, high supervisor workload, poor adherence reporting deadlines, difficulty in reaching communities within allocated time and untimely release of programme funds. Poor accuracy of data was mainly attributed to inadequate motivation for community health volunteers and difficulty calculating summaries.

Conclusion: This study has shown that there are relevant issues that need to be addressed in order to improve the quality of lymphatic filariasis treatment coverage reports. Some of the factors identified are problems within the health system; others are specific to the community health volunteers and the lymphatic filariasis programme. Steps such as training on data reporting should be intensified for community health volunteers, allowances for community health volunteers should be re-evaluated and other non-monetary incentives should be provided for community health volunteers.

Background

Disease control and elimination programmes depend on prompt reporting of data from the field or communities to monitor progress, treatment coverage and facilitate decision making for public health.[1] It is therefore important for public health programmes to have reliable data for decision making and planning[2] in order to ensure targets are being met. Data which are generated, ought to be timely, accurate, complete, legible and accessible in order to meet the requirements of the stakeholders.[3]

Health information systems in resource-limited countries are, however, challenged in producing high-quality data for health programmes.[4] This is due to factors such as limited trained personnel, inadequate supervision,[5] limited financial resources and lack of investment in monitoring and

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evaluation.[1] Data quality (DQ) assessment studies in resource-limited settings have been conducted on programmes such as antiretroviral treatment,[6] tuberculosis (TB)[1] and malaria.[7,8] Other DQ assessments have been conducted on data from primary health care,[9] Expanded Programme on Immunisation (EPI)[10,11] and other infectious disease surveillance.[12–15] They have usually focused on timeliness, accuracy and completeness of the surveillance systems. In all these studies, it was demonstrated that poor DQ affected the ability of programmes to effectively monitor targets for these disease control programmes.

A number of neglected tropical diseases (NTDs) such as lymphatic filariasis (LF), onchocerciasis, soil-transmitted helminthiasis and schistosomiasis, have the potential to be controlled and eliminated from society.[16] This can be made possible through preventive chemotherapy, vector control, health systems strengthening, improved hygiene and proper case-management of diseases.[17] However, for these strategies to work effectively, reliable data should be available to help programmes manage the diseases.

The Neglected Tropical Diseases Control Programme (NTDP) is responsible for the annual mass drug administration (MDA) of ivermectin and albendazole in LF and onchocerciasis endemic areas in Ghana. The MDA is conducted annually using the community-directed treatment[18] approach where drugs are distributed house-to-house by community health volunteers (CHVs).

Studies on NTD data accuracy by authors like Worrell and Mathieu[19] and Allen and Parker[20] have raised questions about the quality of treatment coverage data. While these are important, it is equally necessary to identify reasons why the data may be of poor quality. Kunimitsu's[7] assessment of clinical malaria records in the Solomon Islands found a vast discrepancy between clinical records and government statistics, which was attributed to high numbers of patients, illegible writing, the disuse of tally sheets and insufficient resources.

LF MDA data reporting has been considered a problem for the programme for a number of years. Anecdotal evidence also suggests that there may be discrepancies in reported treatment coverage and actual treatment coverage in endemic areas in Ghana. It was therefore necessary to investigate these issues in order that solutions can be devised to resolve them. Determining the factors influencing DQ can impact the design of new approaches to improve DQ. This study therefore set out to identify reasons for the poor state of data reported for LF MDAs in two districts in Ghana.

Materials and methods

The study was conducted in the Nzema East Municipality and Ahanta West District of the Western Region of Ghana. The two districts have a population of 60,828 and 106,215, respectively.[21] The Nzema East Municipality is made up of 79 communities, which are managed under five sub-municipalities. The municipality has approximately 60 CHVs who distribute

drugs during the MDA. The LF elimination programme began in the year 2002 in this municipality. The main economic activities in the district are farming, fishing, trading and small-scale mining. It is made up of mostly rural communities (66%) with a literacy rate of 42.5% (literacy in both English and local language).[22] The roads are mostly third class roads, and travelling in the wet season can be quite difficult.

The Ahanta West District has 123 communities managed through four sub-districts for implementation of health activities. It was one of the five districts that began the LF elimination programme in 2001. This district has approximately 160 CHVs for the LF MDA. The main economic activities in the district are farming, small-scale trading, fishing and few formal sector workers. This district is also mostly rural (71%) with a literacy rate of 37% in both English and the local language.[22] Communities are larger and closer to each other in the Ahanta West district, and this makes travelling between communities relatively easier. In both districts, the LF programme is managed at the sub-district level by community health officers who are in turn supervised by the district disease control officers.

This was an exploratory study that employed two qualitative data collection techniques: focus group discussions (FGDs) and in-depth interviews (IDIs). It was conducted as part of a larger study whose objective is to determine the feasibility of mobile phone technology for reporting LF treatment coverage.

Four FGDs were conducted with the CHVs in four sub-districts. The groups were drawn from two sub-districts in Ahanta West district and two in the Nzema East Municipal Assembly. The sub-districts were chosen with the help of the district supervisors. The sub-district supervisors at the chosen sub-districts were contacted and asked to recruit 8–10 CHVs for the FGDs. However, the FGDs in the Nzema East had six participants and five participants each. The interviews were scheduled on the market days in the sub-district, when the population usually has easy access to transportation to the sub-district capitals. In the Ahanta West, the two groups were five and seven participants, respectively. The FGDs were organised in the evening during a weekday. An ongoing electricity load shedding exercise in the country caused a power outage in one of the communities on the day of the FGD. This may have affected the participants' decisions to leave their homes for the FGD. The CHVs had to have been drug distributors for more than 1 year and willing to participate in the discussion.

Seven IDIs were conducted with supervisors at the sub-district, district, regional and NTD programme office. Two district level supervisors (from each district), three sub-district supervisors, one regional officer and one national programme officer participated in the IDIs.

A trained research assistant conducted the IDIs and FGDs. The principal researcher took notes and framed follow-up questions to clarify some points during the discussions. One

Table 1. Characteristics of study participants.

		Item	(n = 7)	
Programme supervisors	Sex	Male	5	
		Female	2	
	Years on LF programme	1–6	4	
		7–12	3	
		Item	Ahanta West (n = 13)	Nzema East (n = 11)
Community health volunteers	Sex	Male	8	7
		Female	5	4
	Years as CHV	1–5	4	10
		6–10	1	1
		11–15	8	–

LF: lymphatic filariasis; CHV: community health volunteer.

FGD was conducted by the principal researcher. The FGDs were conducted at the community-based health planning services (CHPS) compounds in the two sub-districts in Nzema East. The Ahanta West FGDs occurred at a community meeting venue in Busua and at a community health centre. The supervisors were also responsible for choosing the venue for the discussions since they had better knowledge of the communities. Permissions were obtained to record the discussion on the digital recorder. The FGDs were conducted in the local languages of the study areas while IDIs were done mostly in English. The interviews lasted approximately 45 min.

IDIs were conducted with the supervisors at the sub-district, district, regional and national levels with an interview guide. The interviews were conducted at the participants' workplaces. Others were done in private meeting rooms or after working hours to ensure privacy. Interviews were recorded with a digital audio recorder. Probes were used to clarify information as the interviews progressed. Questions focused on determining their understanding of the LF MDA programme, programme data reporting process, problems encountered during the MDA and reporting, specific issues that affect reporting timelines, CHVs' approach to the MDA and reporting, the state of reports received and possible solutions to the problems of DQ enumerated.

All the data were analysed manually by the principal investigator. The interviews in English were transcribed verbatim by a research assistant after listening to the audio recordings several times. The discussions in the local languages were translated into English. The principal investigator listened to the local language interviews and compared with the transcripts to ensure the full meaning of statements had been conveyed. The transcripts were analysed using a thematic content analysis[23] approach. Common themes based on the subheading of reporting process, problems encountered during MDA and reporting, and reasons for untimely and inaccurate reports were identified and grouped.

Ethical clearance was obtained from the Ghana Health Service (GHS) Ethical Review Committee. Verbal consent was obtained from all participants in the study both to participate and record the interview sessions. Permission was also obtained from the NTDP and the District Health Directorates. Codes were used to identify participants in the IDIs, and FGD transcripts were only identified by the venue of the discussions.

Results

Characteristics of participants

The supervisors of the programme were made up of five males and two females (Table 1). Three of them had been with the programme since the inception of the LF MDA (12 years). The remaining four supervisors had between 1 and 5 years' experience managing the programme as part of their job schedules. The majority of CHVs who participated were males (n = 14). Majority of them had 1–5 years' (n = 14) experience as CHVs. The CHVs were generally literate and worked as farmers, traders, teachers, community health nurses, self-employed and unemployed persons.

Selection of CHVs for MDA

CHVs are chosen in two ways: by the community or through self-volunteering. In the early years of the LF elimination programme, community members, chiefs and elders were given the opportunity to nominate individuals with some level of literacy to distribute the drugs. However, this practice was not always appreciated by the community because it appeared relatives of these elders were being favoured over other community members. A literate person in these settings is defined *as an individual who can read and write basic English and demonstrate the ability to write their own name.* Those usually chosen to fill this role were teachers, retired workers, farmers, traders and secondary school graduates or any other literate person who was willing to participate. One of the sub-districts also had community health nurses acting

as volunteers for public health outreach programmes due to the small number of volunteers in that sub-district. Other requirements were their ability to keep confidential information, being approachable and having the respect of the community. All the CHVs interviewed had more than two rounds experience in distributing the drugs in the community.

LF MDA process and reporting as described by the CHVs and supervisors

The annual LF MDA begins with a National Review and Stakeholder's Meeting. At this meeting, regional focal persons and other stakeholders from the LF-affected regions in Ghana are invited to review the previous year's MDA and plan the next MDA. Training is also provided on how to report the treatment coverage, financial and other technical reporting. Training is cascaded from the regional supervisors to district supervisors to the sub-district supervisors who then train the CHVs. After training, a period is set for the MDA, and then drugs and registers for the communities are allocated to each volunteer for drug distribution to begin. Although there is no written down timeframe for drug distribution and reporting, the whole process (training to reporting) is usually not expected to exceed 4 weeks. The CHVs record data on household members in each household they visit. At the end of the distribution period, the CHVs summarise the data in each register and record in the summary section at the end of the register. Sub-district supervisors collect the registers, collate the data and submit to the district health supervisors. District health supervisors also collate data for their districts and then submit these to the regional supervisors who ensure treatment coverage has been correctly estimated based on the data they have received. They finally submit the regional data to the programme office at the national level. All interviewees gave similar accounts of the MDA process in their respective districts and did not show a deviation from standard procedure. They were able to recount attending training facilitated by programme officers, which is cascaded down to the volunteers at the community level. CHVs were able to explain how to summarise the data and fill the summary sheets at the end of the registers:

> The supervisor goes for training at Axim DHO (district health office) and when she returns she also comes to organize a workshop for us. After, she tells us the date for the drug administration so when the date approaches, we come for the drugs at the CHPs compound and send to our various target. After administering the drug we bring the outcomes to the supervisor so that she can accumulate the results and write her report. (CHV, FGD, Nzema East)

> Yes we were trained before we started to distribute the drugs. Our supervisors made us to understand that when we go, we have to write the name of the household head and then we use the stick I talked about to measure the height of the rest of the household. According to the measurement, if you deserve to be

given four (tablets of ivermectin), we give you and then add one of the big ones (albendazole tablet). (CHV, FGD, Ahanta West)

> … ok in the first place you see you will be called to region for TOT (Training of trainer) training and after that you also come down to train the supervisors. So after training the sub-district supervisors too, we also go to the ground and train the volunteers. We also give them training before may be we give them the drugs. We do the training in three stages, the region, the district and the sub-district. (District Supervisor, IDI)

Reasons for delayed reporting

No specific date is set for reporting when the MDA is rolled out by the programme. However, submitting reports 4 weeks after MDA was considered unacceptable. Usually, reminders are sent to regional focal persons approximately 3 weeks after completion of MDA in a bid to encourage timeliness. CHVs are given 5 days to distribute drugs and extra 2 days for mopping up and reporting. At the end of 7 days, supervisors in the various sub-districts are expected to collect registers from CHVs and compile summaries for each community within the sub-district. The final data are expected to be delivered to the National Programme office within 3–4 weeks after the MDA.

The most common reasons given for delayed and inaccurate reporting are listed below.

Low numeracy skills. According to the supervisors, although most CHVs are able to write their own names, numeracy skills are generally very low. They are able to fill in records of household members but have difficulty calculating the number of tablets used. Supervisors in both districts indicated that they sometimes calculate the drug doses and this prolongs the collation process, thereby causing delays in reporting. Interestingly, the CHVs did not readily admit having low numeracy skills affects their ability to calculate properly. In the Nzema East, no CHV expressed difficulty in calculating the summaries. However, those in the Ahanta West indicated that it was a tedious process:

> … the common one is the counting of the ivermectin. Sometimes they don't count them well. As for the albendazole, you can go through and you can pick based on the number of people in the household, but with the ivermectin, always, there are differences. (District Supervisor, IDI, Ahanta West)

> I don't have a challenge calculating the summaries. (CHV, FGD, Nzema East)

> We have to use the pencil to work out the numbers. Especially the ivermectin, you have to give 4, 3, 1. We need calculator to do that. We have to use pencils to do that calculation. The albendazole is easier because those are just one one, so you can easily tell the final figure but calculating the ivermectin is difficult. (CHV, FGD, Ahanta West)

The CHVs' manual method of calculating the summaries gives rise to inaccuracies in the summaries presented. Although they all appeared confident that they reported accurately, they did indicate that the calculations were tedious and using calculators would make their work much easier:

> When you give the drugs, example you give ivermectin 3 and albendazole 1, the books are big, the population is big so you have to calculate a lot. And that alone can take about 2 days. We have to calculate a lot and it makes the work difficult. (CHV, FGD, Ahanta West)

> I think we should be given a 'Makola' calculator (calculators used in shops). This is not a serious calculation where we'll need a scientific calculator. Just the regular 'Makola' calculator will help make it easier. (CHV, FGD, Nzema East)

Physical access to communities in the district. Distances between communities in the Nzema East Municipality are wide. Roads and paths leading to some of these communities also pass through forests and across rivers. Accessibility is worsened during the rainy season when rivers overflow their banks and become dangerous to cross. These reasons tend to hinder early collection of the MDA registers from CHVs.

Physical accessibility was a concern for CHVs in the Ahanta West district as well. Communities in this district have been expanding due to population growth. This expansion over the years has made drug distribution more tedious and so affects timely drug administration and reporting:

> Instead of crossing the river, I have to use the road, walk 4–5 miles to the community before I get the report and that also causes delay. (District Supervisor, IDI, Nzema East)

> … The places we have to walk is not easy … there is a lot of mud in our communities. (CHV, FGD, Ahanta West)

Accessibility is also affected by inadequate access to vehicles and motorcycles. Supervisors in the districts and sub-districts do not always have access to vehicles or motorcycles to enable them collect reports from the various sub-districts. Even when vehicles or motorcycles are available, funds to buy fuel into them may not be available. This can result in reports being left at the community level for long periods of time until there is resource allocation. This was a general problem in both districts. Sub-district supervisors who usually commute by motorbike complained the most about the meagre fuel allocated for supervisory visits and report collection:

> … getting registers from the community level also delays because most of them (district supervisors) complain of transport to go to the remote areas to pick the registers. (Regional Supervisor, IDI)

> Our supervisor suffers a lot. Sometimes his motor would not be in good condition so he cannot go round to collect the books. So the supervisor should be equipped so he can go round to collect the books. The other time our supervisor's (own words) bike got spoilt on the road. We had to take off the tyre and put it in a car to go to the next town (own words) for it to be fixed. (CHV, FGD, Nzema East)

Inadequate motivation. The LF MDA gives a minimal monetary incentive compared to other public health programmes, so some CHVs volunteer reluctantly. They indicated that although it was voluntary work, they had to be adequately motivated financially and in other forms. Inadequate motivation or late payment was not considered a reason to hold on to registers, but the low remuneration was a factor in CHVs opting out of the programme. This results in fewer number of CHVs to distribute the drugs, making it difficult to reach the target population within the required time and causing delays in reporting:

> We know it's voluntary work. We serve our nation and our community. The work is difficult. But it's all part of God's work. The walking is difficult. Sometimes we go in the morning then we go in the evening. Sometimes we leave our jobs to do this. So there should be a better motivation for the volunteers so it can boost our morale and we can have love for the work. (CHV, FGD, Ahanta West)

> I believe if we're given bicycles, it'll be helpful. That way if our supervisor is unable to come for the books on time, we can bring them to the health centre ourselves. (CHV, FGD, Nzema East)

> … some opt out when the program starts because when it coincides with cocoa harvesting and the 'galamsay'(small scale gold mining) period, most of them stop and go for the 'galamsay' because that one pays better than the MDA so at times because of that it prolongs the treatment. (Regional Supervisor, IDI)

> … they think the work is so tedious. They think the remuneration is so small and they have to come back to do all those things (calculate summary data). (District Supervisor, IDI, Ahanta West)

> the money has to come. The volunteers have to get something to motivate them. If funds are raised for them, it'll increase their 'taste' for the job. And we to, (supervisors) you should help us too, we will do our best to spread the message more so we can do the one-on-one and door-to-door. (Sub-district Supervisor, IDI, Nzema East)

Inability to reach community members within given timeframe. The main economic activities in the two districts are fishing, farming, trading and mining. Hence, most households cannot be reached during the day. Suitable times for drug distribution appear to be early morning and evening, and this may not give sufficient time to reach the entire population. Some of these communities are also not connected to the national electricity grid, so drug distribution at night is not a feasible option for the CHVs in these communities:

… Because we don't get the people early. Sometimes when they give you a target to achieve, at the end of the five days you would observe you only have half of the target so sometimes we hold on to the report and announce to people to see if we can achieve our target before we release the report. (CHV, FGD, Nzema East)

At times we if we are not able to finish before the supervisor comes, we can tell him that some people have not had some of the drugs and because it is important that everyone gets some of the drug, we add some of the days to it ourselves. Then we go round to do the revisiting. (CHV, FGD, Ahanta West)

some of the problems are to do with absenteeism. When they go to distribute the drugs and they don't meet anybody, they have to go back. And then they also want their coverage so they keep going back until they meet them and this delays the submission of the returns. (District Supervisor, IDI, Ahanta West)

… they go to the house and do not meet them. Where I am is a mining area and a farming area so most of the time they go and do not meet them. (Sub-district Supervisor, IDI, Nzema East)

Supervisors' workload. Supervision is expected to take place during the MDA to ensure the CHVs are adhering to the protocols and to help solve any problems that may arise. Unfortunately, due to the sub-district and district supervisors' high workload, these visits do not always occur. This means inspection of registers to ensure accuracy may not take place. Again, CHVs do not always summarise the treatment coverage data at the end of the MDA. This task is thus left to the supervisors who are already burdened with multiple activities. This causes delays in preparing sub-district and district reports. One sub-district supervisor recounted having to summarise data in the registers after realising the CHVs had made a lot of mistakes:

… we have problems. After giving the medicine, the volunteers, don't summarise the ivermectin and albendazole. You'll see that you'll have to do everything and come and add up. (Sub-district, Supervisor, IDI, Nzema East)

… the same set of district officers are engaged in other activities so they are multi-sectorial officers and therefore data entry prolongs. (Regional Supervisor, IDI)

Supervisors are not always able to verify and ensure summary data are correct. They indicated that it was tedious checking all the entries before preparing the reports. This also invariably affects the accuracy of the reports submitted.

Timely release of implementation funds. Donor funding delays affect the MDA implementation calendar. The programme sometimes coincides with other GHS programmes. The districts may decide to complete these before implementing the LF MDA. These other programmes may also offer more incentives than the LF MDA, leading to less attention for the programme:

Because when there are several activities that coincide with the time of the MDA, and the program comes in with very little money, it is pushed aside and then they go to work on those 'rich' programmes before they later look at it so all these cause delays. (National Supervisor, IDI)

Adherence to reporting deadlines. Regional offices and districts negotiate with the programme office on a schedule which appears to be estimated at 2–4 weeks. The programme office indicated about 50% of all reports reach the programme office within 2–3 months after the drug distribution. The minimum number of days mentioned by a CHV for drug distribution was 3 days in one sub-district, but others indicated a 5- to 10-day timeframe. Most of the CHVs indicated that they are able to meet their treatment targets within the time they are given:

We are given three days, so I divide the community into three and use one day for each part. I believe I am able to distribute to about 98% in my target zone. (CHV, FGD, Nzema East)

There was also an indication that the agreed timetable is usually not adhered to by the districts. So when a 2-week schedule is decided on, reports start trickling in to the regional health office after a month. Both programme officers and regional supervisors indicated they have made trips to some districts to collect data because the reminders were not being adhered to:

Reporting as usual is also a problem because we have timeline, timeline for training the districts, timeline for training volunteers, timeline for data submission and timeline for distribution but then they all violate the timelines. Some submit on time but some do not so at times it takes the whole month for instance when it starts on 10th October the report should be submitted at the month end of October. But at times it goes into the following month. (Regional Supervisor, IDI)

The CHVs also indicated a longer timeframe of about 2 weeks for drug distribution would be sufficient to achieve a higher coverage. This would ensure there would be fewer absentees in the reports. This may also give supervisors more time to thoroughly check the data that have been collected:

Yes we are given five days to do the work … this town is very big, so before you can distribute and do your calculations, you realise that you haven't completed the work within the five days. So they should give us more time because the work is difficult. (CHV, FGD, Ahanta West)

Discussion

This study set out to identify reasons for the state of poor DQ for the LF control programme. The DQ elements for which barriers were examined are timeliness and accuracy of data.

It was clear that all stakeholders in the implementation process were very familiar with the drug distribution and

reporting. The data flow of MDA reports is also well defined and adhered to by all stakeholders. The CHVs' understanding of procedures of distribution and reporting was consistent with Gallo et al.'s findings where CHVs showed a good understanding of their role in delivering contraceptive services in Madagascar.[24] However, the disparity between the two studies is that actual compliance with reporting procedures was not measured in our study.

The standard timeframe agreed on by the programme office and districts, from training till data reporting, is approximately 2–4 weeks, by which time reports were expected to reach the programme office. This does not provide an objective way of measuring timeliness for the programme. This is quite different from a number of studies where timeliness of data was clearly determined electronically in the health information systems being used. The timestamps were used to document dates for reporting.[13,25,26] In this study, we found out CHVs regarded their reporting as timely while supervisors agreed reports are usually submitted late.

Low numeracy skills were found to be one of the factors for delayed reporting and report inaccuracies. The LF programme requires its CHVs to be literate with demonstrated ability to write their name, which is the norm for many programmes worldwide.[27,28] The programme and districts did not have any method of determining numeracy skills although this was crucial for the quality of data produced by the CHVs. Based on the professions of some of the CHVs interviewed, low numeracy skills should not have been a problem for the programme. Accuracy of data has an enormous impact on the quality of data for any health programme.

The problem of inaccessibility could be solved through the provision of improved access to transport in the communities. Study participants called for provision of bicycles and fuel for motorcycles to make travelling easier. Unfortunately, CHVs in these communities have to travel by foot in order to distribute drugs. Supervisors also on the other hand sometimes do not have the means to move from their offices to these communities to collect registers from CHVs. Bhattacharyya et al.[27] indicated some programmes offered bicycles and motorcycles for CHVs to use for their duties but not to own. This would in itself serve as motivation for the CHVs. In 1983, Ofosu-Amaah[29] also identified inaccessibility of villages and lack of vehicles or fuel as reasons for difficulties in supervising CHVs. It is interesting to note that this problem, although identified 30 years ago, is still prevalent today in community health programmes.

CHVs had also indicated calculating the summaries manually was challenging and would prefer using calculators. Gopalan et al.[30] reported CHVs' difficulties in monitoring community surveys due to their low educational levels. The CHVs in Gopalan et al.'s study found recording community surveys as time-consuming and tricky. CHVs' complaint of tedious data calculation and desire to use calculators is a good predictor of the quality of data being submitted. More emphasis should be laid on the reporting component of training. This will ensure CHVs have a better appreciation of the impact of poor reporting.

Low literacy and numeracy is also a reason identified by Mitsunaga et al.[31] for data inaccuracy and is consistent with our results. Arts et al.[32] also identified inaccurate data transcription, typing errors, ineligible handwriting, insufficient training, insufficient data checks and calculation errors as reasons for data inaccuracies in medical registries. They acknowledged that these occur during the data collection process.

The major reasons found for delayed reporting suggest that most delays occur after the reports have been submitted to the sub-district and district levels. The numerous challenges faced by the health systems in these communities tend to affect the MDA reporting as well. There was general complaint regarding tedious compilation of MDA reports, and this appears to influence the supervisors' expected DQ checks. Since this was a qualitative study, findings cannot be generalised for all districts in Ghana. However, reasons like the limited access to transportation, which is a systemic problem in the health sector, could possibly explain delayed reporting in most districts in Ghana. An integrated healthcare delivery approach could be helpful in ensuring resources are maximised by the districts for public health services.[33,34] This will ensure all programmes can be executed with the aim of providing health for all.

Inadequate motivation which was closely related to attrition of CHVs was also considered a factor for delayed and inaccurate records. The researcher did not identify any study on attrition rate of CHVs for NTD programmes. However, a study by Abbey et al.[35] established an attrition rate of 21.2% in a study on community-based management of fevers in children under 5 years in the Dangme West District of Ghana. The volunteer community health workers in this study gave reasons such as low remuneration, possible weak sense of social responsibility and negative attitude of caregivers as reasons for attrition. Although attrition was not directly investigated in this study, CHVs indicated low remuneration, arduous task of covering large geographical areas to distribute drugs and lack of other non-monetary incentives as reasons for wanting to leave the programme. The same reasons were shared by supervisors when they discussed attrition of CHVs as one of the causes of delayed and inaccurate reporting. CHVs indicated non-monetary incentives, such as identification cards, T-shirts, hats, bicycles and preferential treatment, at the district hospitals or health centres would compensate for the low remuneration they received for the work they did. These thoughts were expressed although they understood they were volunteers. Similar findings were reported by Gopalan et al.[30] in their study on performance motivations of community health workers in India and Bhattacharyya et al.'s [27] article on community health workers' incentives and disincentives.

Conclusion

Reasons for the poor state of data for the LF programme are both intrinsic in the CHVs and extrinsic (occurring within the health system). It is also clear from the study that CHVs fully understand their role in the LF MDA process and treatment coverage reporting. Reasons for the present state of the LF MDA treatment reports were low numeracy skills among CHVs, poor physical access to communities, poor adherence to reporting deadlines, untimely release of implementation funds and supervisor's workload. Possible remedies to the barriers identified could be reorienting CHVs on reporting quality data and other non-monetary incentives such as raincoats, boots and identification for CHVs. An integrated healthcare delivery approach, where public health resources are pooled and shared among various health programmes, could also help reduce the problem of limited resources. As part of health reforms, the health system can consider creating an opportunity for CHVs to earn wages. Other local donors could also be identified to support the LF MDA programme in the districts. The study has provided an avenue for poor DQ generated through district level MDAs to be addressed. Understanding the reasons for the poor DQ will help carve ways of improving the quality of the data.

References

1. Heunis C, Wouters E, Kigozi G, et al. Accuracy of tuberculosis routine data and nurses' views of the TB-HIV information system in the Free State, South Africa. *J Assoc Nurses AIDS Care* 2011; 22: 67–73.
2. AbouZahr C and Boerma T. Health information systems: the foundations of public health. *Bull World Health Organ* 2005; 83: 578–583.
3. World Health Organization. *Improving data quality: a guide for developing countries*. Manila, Philippines: World Health Organization Regional Office for the Western Pacific, 2003. http://www.wpro.who.int/publications/docs/Improving_Data_Quality.pdf (accessed 16 January 2014)
4. Ledikwe JH, Grignon J, Lebelonyane R, et al. Improving the quality of health information: a qualitative assessment of data management and reporting systems in Botswana. *Health Res Policy Syst* 2014; 12: 7.
5. Wilkins K, Nsubuga P, Mendlein J, et al. The Data for Decision Making project: assessment of surveillance systems in developing countries to improve access to public health information. *Public Health* 2008; 122: 914–922.
6. Makombe S, Hochgesang M, Jahn A, et al. Assessing the quality of data aggregated by antiretroviral treatment clinics in Malawi. *Bull World Health Organ* 2008; 86: 310–314.
7. Kunimitsu A. The accuracy of clinical malaria case reporting at primary health care facilities in Honiara, Solomon Islands. *Malaria J* 2009; 8: 80.
8. Chilundo B, Sundby J and Aanestad M. Analysing the quality of routine malaria data in Mozambique. *Malaria J* 2004; 3: 3.
9. Mahmood S and Ayub M. Accuracy of primary health care statistics reported by community based lady health workers in district Lahore. *J Pak Med Assoc* 2010; 60: 649–653.
10. Mavimbe JC, Braa J and Bjune G. Assessing immunization data quality from routine reports in Mozambique. *BMC Public Health* 2005; 5: 108.
11. Crabb C. Developing countries overstate vaccination coverage. *Bull World Health Organ* 2003; 81(11), http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2572359/
12. Curtis AB, McCray E, McKenna M, et al. Completeness and timeliness of tuberculosis case reporting: a multistate study. *Am J Prev Med* 2001; 20: 108–112.
13. Jajosky RA and Groseclose SL. Evaluation of reporting timeliness of public health surveillance systems for infectious diseases. *BMC Public Health* 2004; 4: 29.
14. Reijn E, Swaan CM, Kretzschmar ME, et al. Analysis of timeliness of infectious disease reporting in the Netherlands. *BMC Public Health* 2011; 11: 409.
15. Randrianasolo L, Raoelina Y, Ratsitorahina M, et al. Sentinel surveillance system for early outbreak detection in Madagascar. *BMC Public Health* 2010; 10: 31.
16. Accelerating work to overcome the global impact of neglected tropical diseases – a roadmap for implementation, http://www.who.int/neglected_diseases/NTD_RoadMap_2012_Fullversion.pdf (2012; accessed October 2014).
17. *Working to overcome the global impact of neglected tropical diseases: first WHO report on neglected tropical diseases*. World Health Organization, 2010, http://whqlibdoc.who.int/publications/2010/9789241564090_eng.pdf?ua=1
18. Gyapong M, Gyapong JO and Owusu-Banahene G. Community-directed treatment: the way forward to eliminating lymphatic filariasis as a public-health problem in Ghana. *Ann Trop Med Parasitol* 2001; 95: 77–86.
19. Worrell C and Mathieu E. Drug coverage surveys for neglected tropical diseases: 10 years of field experience. *Am J Trop Med Hyg* 2012; 87: 216–222.
20. Allen T and Parker M. The 'other diseases' of the Millennium Development Goals: rhetoric and reality of free drug distribution to cure the poor's parasites. *Third World Q* 2011; 32: 91–117.

21. Ghana Statistical Service. *Population by region, district, age groups and sex, 2010*, 2012, http://www.statsghana.gov.gh/docfiles/pop_by_region_district_age_groups_and_sex_2010.pdf

22. Ghana Statistical Service. *2010 Population and Housing Census, Regional Analytical Reports*. Western Region, 2013, p. 266. Accra, Ghana http://www.statsghana.gov.gh/docfiles/2010phc/2010_PHC_Regional_Analytical_Reports_Western_Region.pdf

23. Green J and Thorogood N. Qualitative methods for health research. 3rd ed. London: SAGE, 2014.

24. Gallo MF, Walldorf J, Kolesar R, et al. Evaluation of a volunteer community-based health worker program for providing contraceptive services in Madagascar. *Contraception* 2013; 88: 657–665.

25. Yoo HS, Park O, Park HK, et al. Timeliness of national notifiable diseases surveillance system in Korea: a cross-sectional study. *BMC Public Health* 2009; 9: 93.

26. Lo HY, Yang SL, Chou P, et al. Completeness and timeliness of tuberculosis notification in Taiwan. *BMC Public Health* 2011; 11: 915.

27. Bhattacharyya K, Winch PJ, LeBan K, et al. Community *health worker incentives and disincentives: how they affect motivation, retention, and sustainabilty*. Arlington, Virginia: Basic Support for Institutionalising Child Survival Project (BASICS II) for the United States Agency for International Development, 2001.

28. Njomo DW, Amuyunzu-Nyamongo M, Magambo JK, et al. The role of personal opinions and experiences in compliance with mass drug administration for lymphatic filariasis elimination in Kenya. *PloS ONE* 2012; 7: e48395.

29. Ofosu-Amaah V. *National experience in the use of community health workers: a review of current issues and problems*. Geneva: World Health Organization, 1983.

30. Gopalan SS, Mohanty S and Das A. Assessing community health workers' performance motivation: a mixed-methods approach on India's Accredited Social Health Activists (ASHA) programme. *BMJ Open* 2012; 2: e001557.

31. Mitsunaga T, Hedt-Gauthier B, Ngizwenayo E, et al. Utilizing community health worker data for program management and evaluation: systems for data quality assessments and baseline results from Rwanda. *Soc Sci Med* 2013; 85: 87–92.

32. Arts DGT, de Keizer NF and Scheffer G-J. Defining and improving data quality in medical registries: a literature review, case study, and generic framework. *J Am Med Inform Assoc* 2002; 9: 600–611.

33. Dudley L and Garner P. Strategies for integrating primary health services in low- and middle-income countries at the point of delivery. *Cochrane Database Syst Rev* 2011; CD003318.

34. Hope R, Kendall T, Langer A, et al. Health systems integration of sexual and reproductive health and HIV services in sub-Saharan Africa: a scoping study. *J Acquir Immune Defic Synd* 1999; 2014; 67(Suppl. 4): S259–S270.

35. Abbey M, Bartholomew LK, Nonvignon J, et al. Factors related to retention of community health workers in a trial on community-based management of fever in children under 5 years in the Dangme West District of Ghana. *Int Health* 2014; 6: 99–105.