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Original Research Article

An Evaluation of the Malaria Surveillance System of Chipinge District, Manicaland Province

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ABSTRACT

Introduction: Strengthening malaria surveillance is fundamental to programme planning and implementation and is crucial for accelerating progress. Globally, an estimated 3.2 billion people are at risk of being infected with malaria and developing the disease and of these 1.2 billion are at great risk. This study evaluated the malaria surveillance system of Chipinge district, Manicaland province.
Methodology: The study was based on a cross-sectional survey design. The target population included Health workers and community health cadres. Twenty seven (27) Health Workers (Nurses, Nurse Aides, environmental health technicians) and 12 Village health workers (VHW) from 12 Health facilities were selected based on systematic sampling. The participants were interviewed using a structured interview schedule. Key informants were the DEHO (District Environmental Health Officer), DHIO (District Health Information Officer) and the DMO (District Medical Officer). The sample size was calculated using Epi info 7. The evaluation consisted of a structured questionnaire and checklist for surveillance facilities at the health centres level. The checklist was used to determine availability and functionality.
Results: The assessment was based on the ability to recall key elements or objectives of the Weekly Disease Surveillance System (WDSS). Nineteen (70.4%) recalled at least two elements of the WDSS. Surprisingly, 11 (57.9%) who had less than five year in service recalled at least two elements compared to 8 (42.1%) who had been in service for more than 5 years. The Odds of the health worker not recalling at least 2 elements of the WDSS is 1.212 (95% CI=0.22; 6.61) higher if they had less than 5 years on duty compared to those with at least 5 years on duty. All the 27 respondents perceived the Malaria surveillance system as useful, flexible, acceptable and easy to operate. However there is a gap of the absence of a spot maps that shows distribution of Malaria and other health events.
Conclusion: The Malaria Surveillance system of Chipinge district is acceptable, flexible, useful and simple. However, the system has some limitations on usefulness, stability, timeliness and completeness of VHW reports. Some health workers at health facility levels are not yet able to interpret the surveillance data for early detection and management of outbreaks hence the need for further training.

Keywords: Malaria Surveillance, Evaluation, Spot Maps, Health Workers

INTRODUCTION

Public Health Surveillance is the ongoing systematic collection, compilation, analysis and interpretation of data related to the health of a community and feedback of information to those who need to know in order for action to be taken, (WHO Surveillance standards 2^{and} edition, 2000).

According to pillar number 3 of the Global technical strategy of Malaria 2016 to 2030, Malaria surveillance should be turned into a core intervention of malaria

management programmes. Strengthening malaria surveillance is fundamental to programme planning and implementation and is crucial for accelerating progress. The strategy also points out that all countries where malaria is endemic should have an effective malaria surveillance system in order to direct resources to the most affected population identify gaps in programme coverage, detect outbreaks and assess the impact of interventions to guide changes in programme planning and implementation.

Globally, an estimated 3.2 billion people are at risk of being infected with malaria and developing the disease and of these 1.2 billion are at great risk. A total of 198 million cases of malaria occurred globally in 2013 and these led to 580 000 deaths. Malaria burden is greatest in the WHO African region where an estimated 90% of all malaria deaths occur and children aged under 5years account for 78% of deaths, (World Malaria Report, 2014).

In Zimbabwe, Malaria surveillance is a component of the national Weekly Disease Surveillance System (WDSS). The WDSS is a core component of the national health system notification and response plans. The system covers at least 14 diseases of public health importance that include cholera, malaria, vaccine preventable disease and snake and dog bites. Malaria data collected at community level by Village Health Workers (VHWs) is submitted to the respective health facilities. Malaria data from inpatients and outpatients is also collected at the health centre level; all data are compiled and sent to the district.

By 2007, the monthly reporting system and the Weekly Disease Surveillance System (WDSS) in Zimbabwe was not fully functional and reporting levels from service delivery facilities stood at around 50% and 45% for the monthly and WDSS, (UNDP, (2014), Innovation in Zimbabwe's Health Information System)

In 2010, Zimbabwe's Weekly Disease Surveillance System (WDSS), continued to suffer incomplete and delayed reporting. Rural health facilities had difficulty communicating reports to their District Health Offices due to lack of radios, phones, or internet connectivity. Only 11% of those health facilities had functional radios. The MOHCC measures timeliness as a proportion of facility reports received at the national facility before Wednesday. Completeness is the proportion of facilities contributing to the report, (ICT edge, (2013), Disease Surveillance).

In 2010, DHIS version 1.4 was rolled-out to all districts in Zimbabwe. The MOHCC worked closely with Centers for Disease Control and Prevention (CDC) in Zimbabwe to produce timely and complete data for disease surveillance, (MOHCC report, 2010).

Malaria Case reporting is carried out in Zimbabwe using the Health Information Management System (HIMS). Malaria is reported weekly, monthly and quarterly. The data since 2005 is now being collected by age and gender. In 2005 there was a 17% drop in Malaria cases and 50% drop in malaria cases and a 50% drop in Malaria deaths when compared to 2004, this was due to revival of the IRS, ITNS, and the strengthening of the case management programmes, (Zimbabwe National Malaria Strategic Plan, 2013).

Chipinge district, Malaria incidence has been on the decline over the years, although the district target should be a near 0 malaria deaths, for the period January to July 2015 the district recorded 17 deaths, (Provincial malaria report, (2015), National Malaria conference)

Generally, over the past 4 years in Chipinge District, Timeliness and Completeness has been improving significantly. Completeness of reports was increasing at a rate that was slightly higher than completeness from the year 2012 to date as indicated in table 1.0 below.

Table1.0. Chipinge district Surveillance Report, 2015.

Surveillance Indicator	2012	2013	2014	2015 Week 1	2015 Week 6
Timeliness	85%	92%	100%	42%	41%
Completeness	92%	95%	100%	100%	100%

Completeness and timeliness are currently at 100% but unlike completeness, timeliness has been below 100% for the period starting week 1 to week 6 of 2015.

In week, 29 there were 248 Malaria positive cases a decline from 399 cases of week 28, the number of deaths is zero. Case Fatality Rate is (CFR) is 03/1000, (Chipinge district WDSS report, (2015) week 29).

The introduction of the use of cell phones in 2011 saw completeness of weekly diseases surveillance system reports increasing from under 50% in 2010 to above 90% in 2013. In 2014 an additional 450 cell phones were procured for the WDSS. The Global Fund also continued to support the WDSS through funding airtime, Insight, Global Fund, UNDP, 2014).

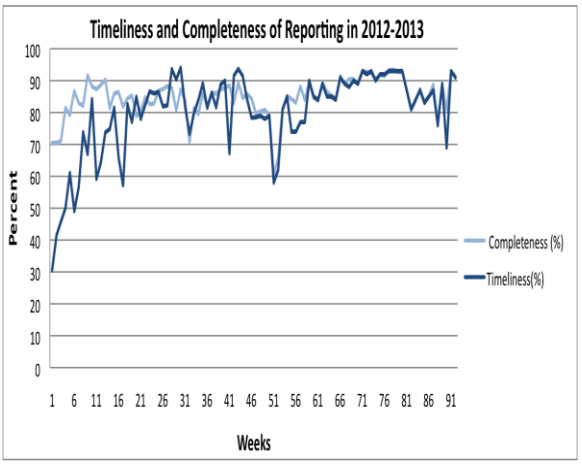

Fig1.2. Zimbabwe's reporting Timeliness and Completeness for the year 2012 and 2013.

The National Health Information System:

In response to increasing demand of data for planning, implementation, and monitoring of health programmes the Ministry of Health and Child Care designed and piloted the National Health Information and Surveillance System (NHIS) in 1985. In line with continued efforts to strengthen the health, information system posts for Health Information Officers (HIO) were created at provincial, district and mission Hospital levels. This was supported by the introduction of health information training at Harare Polytechnic course. In 2005, a study was launched to look at factors affecting the National Health Information system. The following weaknesses were identified:

- Lack of central repository or data warehouse for integrating HIS data sources
- Frequent shortages of forms for the recording and reporting and systems at facility level
- Inadequate analysis and use of Information
- Lack of data authentication
- Poor selection of sentimental surveillance sites
- Inadequate Human resources for HIS, (Zimbabwe Heath Information Strategy, 2014).

The goal of the Health Information Strategy:

The goal is to optimize the performance of the health services at all levels through the strengthening of the Health Information System. This is to enhance the provision of necessary and sufficient Information needed by consumers, health workers, managers and policy makers to plan, implement, monitor and evaluate the delivery of health services in Zimbabwe (Zimbabwe Health Information Strategy, 2014).

Integrated Disease Surveillance Response (IDSR):

Disease surveillance and Epidemic Management, Integrated Disease Surveillance and Response (IDSR) training was carried out at all levels, national, provincial and district to equip health workers with skills to be able to detect and respond to Malaria epidemics, among other epidemic prone diseases. Malaria thresholds were calculated for all health facilities with support from the district health officers allowing them to detect and effectively manage outbreaks on time,

Strategy C of the 2013 Malaria Strategy was to detect and effectively manage at least 95% of Malaria epidemics within two weeks of onset and to increase Malaria free zones in Zimbabwe, (Zimbabwe National Malaria Strategic Plan, 2013).

Malaria Case Management:

The first line Malaria treatment drug is artemisinin based combination ACT drug artemether-lumefantrine (AL). At the end of 2010 the Pharmacy Board and the laboratory regulatory council allowed community based health workers (CHWs) to perform diagnosis using RDT and dispense ACT for positive cases (Zimbabwe National Malaria Operational Plan, 2015).

Health Information flow:

Information is collected at the health facility and analyzed before being sent to the District or Provincial Level until it reaches the Ministry of Health National Information Unit. Data is entered into computers at the district and hospital level and electronically transmitted to the PMD which transmit it further to the PMD which transmit it further to the Head Office. Monitoring and supervisory visits by the district and provincial team are used as opportunities to collect completed data collection forms and provide feedback to the health facilities. Data also comes from other sources such as vital registration systems, censuses, surveys, assessments, and researches into the health information system through the district and Provincial levels.

The Weekly Disease Surveillance System:

Data is send to a frontline SMS server where data is checked for quality and completeness. The data is automatically transferred to central DHIS2 server where authorized health information Officers can monitor the data. Authorized Health Information officers may also view data received from facilities that are not yet able to use Frontline SMS.

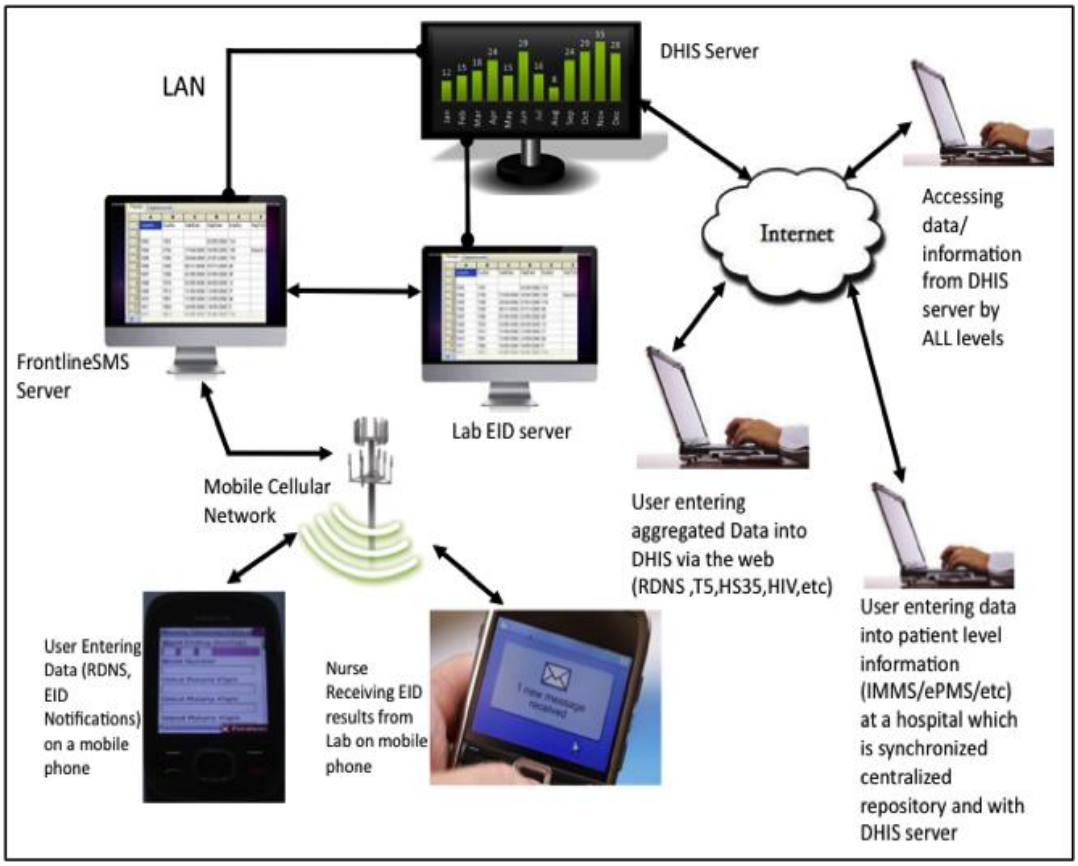

Fig 1 The WDSS: Flow of data:
Source: Disease Surveillance ICT edge, 2013

METHODOLOGY

The study was based on a cross-sectional survey design. The target population included Health workers and community health cadres. Twenty seven (27) Health Workers (Nurses, Nurse Aides, environmental health technicians) and 12 Village health workers (VHW) from 12

Health facilities were selected based on systematic sampling. The participants were interviewed using a structured interview schedule. Key informants were the DEHO (District Environmental Health Officer), DHIO (District Health Information Officer) and the DMO (District Medical Officer). The sample size was calculated using Epi info 7. The evaluation consisted of a structured questionnaire and checklist for surveillance facilities at the health centres level. The checklist was used to determine availability and functionality. Malaria cases were defined as follows:

Suspected Case:

Any person living in a malaria area or history of travelling in a malaria area within the last 6weeks, presenting with fever, malaise, chills and rigors, without signs of severe disease such as vital organ dysfunction.

Confirmed Case:

Uncomplicated Cases: suspected uncomplicated malaria with laboratory diagnosis by malaria blood slide or RDT for malaria parasites.

Complicated Cases: A patient hospitalized with P. falciparum asexual parasitaemia as confirmed by laboratory tests with accompanying symptoms of severe disease (vital organ dysfunction), (MOHCC, Week 44 report on Public Health Events, 2015).

Ethics.

Permission to conduct the study was sought from the Provincial Medical Director (PMD) through the District Medical Officer (DMO). Documented informed consent was also sought from all participants. All data were treated confidentially.

Data management

Data were analysed through multivariate analysis using the Statistical Package for Social Sciences (SPSS) version 20.

RESULTS

Demographics:

A Sample size of 27 Facility based Health workers and 12 VHWs was selected for interviews. The sample had representatives from 12 Health Centres in Chipinge district and members of the District Heath Team (DHT). The participant's demographic characteristics are summarized in table 1 below

Table1: Sample Demographics

Characteristics		Frequency
Health facilities	Hospitals	1
	Clinics	12
Sex of Respondents	Male	15
	Females	27
Designation	Dr	1
	DHIO	1
	DEHO	1
	Nurse	15
	Nurse Aid	10
	Primary Care Counselor	2
	VHWs	12

Facility based Health Workers' Knowledge on the Surveillance System:

A total of 27 Health workers (Nurses, Nurse Aids, and Primary Care Counselors) were assessed on their knowledge levels of the Malaria Surveillance and the Weekly Disease Surveillance system (WDSS). The assessment was based on the ability to recall key elements or objectives of the Weekly WDSS. Nineteen (70.4%) recalled at least two elements of the WDSS. Surprisingly, 11 (57.9%) who had less than five year in service recalled at least two elements compared to 8 (42.1%) who had been in service for more than 5 years.

The Odds of the health worker not recalling at least 2 elements of the WDSS is 1.212 (95% CI=0.22; 6.61) higher if they had less than 5 years on duty compared to those with at least 5 years on duty. Thus the odd were not statistically significant.

All the 27 (100%) respondents pointed out that reports should be submitted to the DHIO by every Monday of the week. However some suggested that they send the reports on Sunday and some send early in the morning on Monday morning. Eighteen (66.7%) recalled at least 3 of the health information forms or malaria registers while 9(33.3%) could not recall names of at least 3 forms.

Usefulness of the Surveillance System:

All the 27 respondents perceived the Malaria surveillance system as useful. In

addition all the respondents agreed that they make use of the Malaria surveillance system but they use the data differently, the use of data by the respondents is shown on the pie chart in figure 2 below.

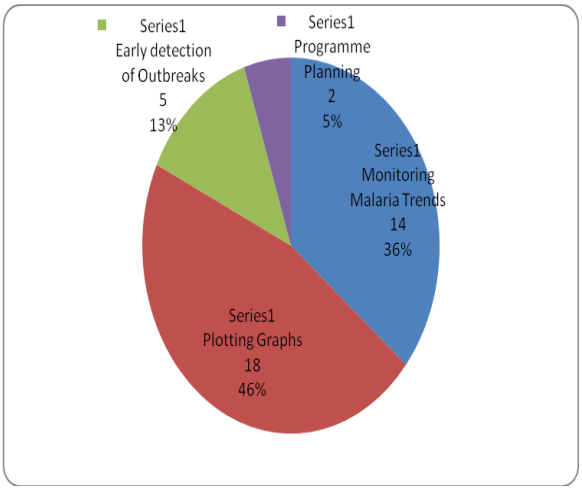

Figure 2: Use of Malaria Data at the health facility

Although all the 27 respondents agreed that they conduct meetings on Malaria surveillance data and the Weekly Disease Surveillance System. Minutes of the previous meetings on disease surveillance were available in only 5(41.67%) out of the 12 Clinics.

Simplicity of the Surveillance system:

The health workers were also assessed on whether they found it easy to operate the malaria surveillance system. All the respondents 27(100%) pointed out that the system is easy to operate, the 27 are made up of 15(55.6%) Nurses, 10(37%) Nurse Aids and 2(7.4%) were Primary Care Counselors (PCC). At the same time none of them reported any difficulties in operating the system. However on whether they needed a training to operate the surveillance system 6(22.2%) said they need training and 21(77.8%) said they do not need training.

Flexibility of the Surveillance system:

The discussion with the District Health Information Officer of Chipinge District reaffirmed that Malaria Surveillance system is a subset of the WDSS and the system is flexible in accommodating other disease in addition to Malaria. In addition to Malaria other disease that are reported in the WDSS are Cholera, Typhoid, Anthrax, Plague, Rabies, Measles and many others. Consequently, it was also learnt that the respondents got to learn about the Malaria surveillance system through various ways, 24(88.9%) on job training, 9(33.3%) workshops and 14(51.9%) both on job trainings and workshops.

Acceptability:

The majority 26 (96%) of the participants agreed that they participate in the malaria surveillance system but they have different roles in the system. Multiple responses were given and the roles included Data tallying in the T forms, Analysis of Data, Reporting to the district and Dissemination of Information. The responses are summarised in figure 3 below.

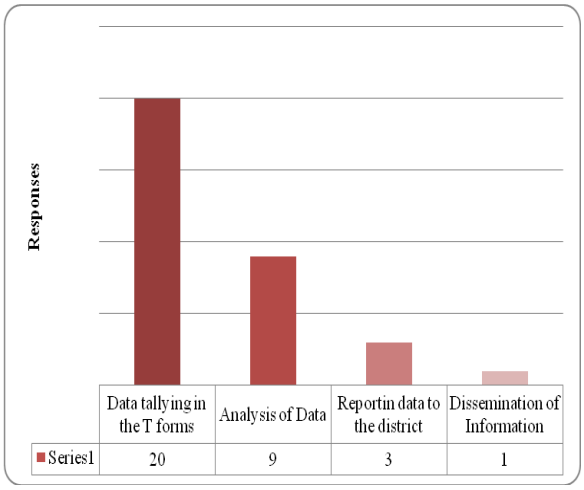

Figure 3: Roles in Malaria Surveillance

Stability:

In terms of availability of functional devices of the surveillance system, the 12 Health facilities were assessed for the availability of a functional Cell phone, Internet Services, Radio Communication, Printer, Photocopy, Motor Cycle, Surveillance forms and new malaria Case Definitions guidelines. The responses are shown in figure 4 below.

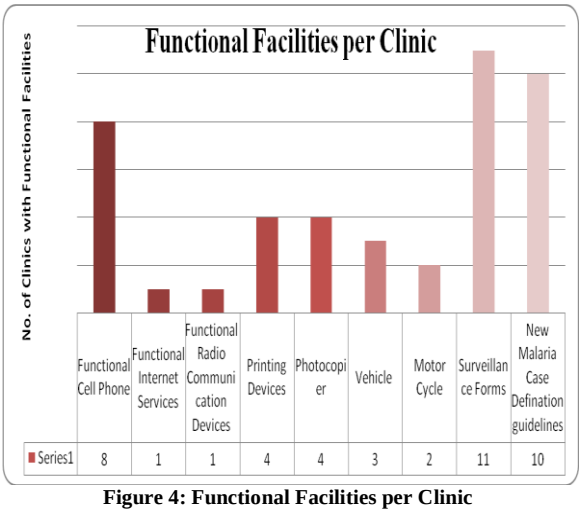

Figure 4: Functional Facilities per Clinic

The respondents were asked if ever they had experienced breakdowns with their facilities, 14(51.9%) said they do experience breakdowns and 13(48.1%) said they do not normally experience breakdowns. The most pointed communication breakdowns were cell phone network challenges, technical breaking down of the cell phone and electricity challenges.

Timeliness:

All the respondents said they submit Malaria data to the district weekly through the Weekly Disease Surveillance System (WDSS). However following review of WDSS reports at district level, timeliness has generally improved as from week 1 of year 2015. The following table shows the results:

Timeliness on yearly basis:

Annually, timeliness for Chipinge District has been on the increase from year 2012 to year 2014. It was at 92% in 2012, 95% in 2013, and 100% in 2014. The trends are according to the district annual diseases surveillance reports, Chipinge District 2015 are shown in table 2 below.

Table 2: Timeliness on weekly Basis (Year 2015)

Week No.	1	2	3	4	5	6	7	8	9	10	11	12	13-28
Timeliness (%)	44	83	84	82	100	41	100	100	100	100	100	100	100

Seven (25.9%) participants failed to meet reporting deadlines, and they pointed out a number of reasons for not meeting deadlines. Three (42.9%) attributed failure to meet deadlines to ahuge workload, two (28.6%) blamed communication constraints such as cell phone network challenges and the other two (28.6%) attributed it to shortage of Human resources.

Completeness:

At district level completeness of reports has been increasing from 92% in 2012, 95% in 2013 and 100% in 2014. Between week 1 to week 28, 2015, completeness of reports was at 100%.

An assessment was also made on the Malaria threshold graphs of the 12 Clinics under investigation, 11 out of 12 (91.7%) participants had a graphical presentation of Malaria trends of 2015. In addition some of the characteristics of the threshold graphs are summarized in Table 3.

Table 3: Health Centre Malaria Threshold graphs (status).

Health Centre Malaria threshold graphs (Status)	**Number of Health Centres with the described Indicators**
Malaria Threshold line graph available and displayed	11 (91.7%)
Graphs with updated values of actual cases to week 28	8 (66.7%)
Graphs with updated alert values	9 (75%)
Graphs with updated action values	9 (75%)
Graph A4 in Size	9 (75%)
Graph with size larger than A4	3 (25%)
Graphs with neat presentation (1), displayed on the Wall (1), and Clearly visible (1)	7 (58.33%)

At district level, review of reports showed that the completeness of reports from week 1 to week 28 of year 15 is at 100%. However there are 52 Clinics in the district, 51 of them are expected to report on Malaria Data, the other Clinic that does not

report on Malaria is the New Start Centre, it specializes on HIV and AIDS management programmes. Of the 51 that are supposed to report 50 are reporting regularly but there is one known Clinic in Chipinge town that does not report regularly. Completeness of reports is summarised in table 4.

Table 4: Chipinge District Malaria Surveillance Reporting Completeness.

Focus Area	Target	Actual 2013	Actual 2014	Jan-June 2015
Malaria Surveillance	≥ 95% completeness of reporting (T5)	97%	99%	99%
Malaria Surveillance	≥ 95% of reporting (VHW)	2.9%	15.6%	59.3%
Entomologic Surveillance	100% entomological surveillance sites functional	3 sites 100%	3 out of 8 sites and 1 control 25	3 out of 8 sites and one control 38%

Feedback:

The 27 respondents indicated that they receive feedback from the District after sending data; feedbacks are in the form of phone calls (21), texts (16) and oral briefings with the District Health Information Officer (19).

In the 12 Health centres under assessment, 11(91.67%) had catchment area maps, but only 3 (25%) health centres had Spot maps showing the general distribution of health events including Malaria.

Data Quality:

Twenty-four denied making errors in document completion, 3 (10%) made errors sometimes, 2 (7%) accepted having made errors while another 2 (7%) had no idea. In addition, out of the 27 respondents, 21(77.8%) reported that data is checked for errors before sending to the next level. Out of the 21 a total of (85.7%) said it is the duty of the Nurse in charge to check the forms before sending to the next level whilst 3 (14.2%) said that anyone else at the health centre could check for errors before final sending of the forms.

DISCUSSION

Demographics

In this surveillance study, more clinics than hospitals were covered (1 hospital and 12 Clinics). This is in line with the fact that the district has more clinics to hospitals. The same sample size of 12 clinics is almost close to the sample size of a similar study that was conducted this year in Beitbridge to evaluate the district notifiable disease surveillance system. The study had a sample size of 11 clinics and it interviewed 57 health workers, (Juru P, Tsitsi, Ncube Nomagugu etal 2015).

Health Workers Knowledge on the disease surveillance system:

The knowledge levels of the Weekly Disease Surveillance System and Malaria were high; those who could recall at least 2 elements of the weekly disease surveillance system were 19 (70.4%). However this also indicates that (8) 29.6% of the respondents have low knowledge of the WDSS. These could not recall at least 2 elements of the surveillance system. Although those with low knowledge levels are few, chances are high that they can also affect reliability of data produced by the system. A more efficient system needs to be based on a knowledgeable team of health workers.

Contrary to the findings of the Beitbridge evaluation study, the knowledge levels of health workers on the notifiable disease surveillance system were far lower 57%. Such a difference could be attributed to the difference in the sample sizes of the two studies; the Beitbridge study sample size is almost 2 times higher than the Chipinge district study. Consequently the difference in settings, different districts have different interventions hence different knowledge levels of health workers on the WDSS.

Similarly, the knowledge levels of participants in this study are almost close to the knowledge levels of health workers to the evaluation study of Acute Flaccid Paralysis (AFP) Surveillance System in Zvimba District. In the AFP surveillance system the knowledge of workers on the

surveillance system was 83% whilst in this study the knowledge levels are 70.4%. The two sample sizes were approximately the same and the study designs are all descriptive cross-sectional studies hence the similarity. The study on AFP surveillance was done by Tapera Saravoye, Magret Nyandoro, Donewell Bangure et al in 2013.

Following the assessment of the relationship between being less than 5 years or more and ability to recall at least 2 elements of the WDSS. The findings show that the association is not statistically significant since the confidence interval of the odds ratio spans a 1.0.

Usefulness of the Malaria Surveillance system:

All the respondents 27(100%) regarded the Malaria surveillance system as useful, However the use of data was varied across the population, only 36% said they use the data to monitor malaria trends while 46% said they use the data to plot graphs. The major purpose of the malaria surveillance system is monitoring trends for outbreak prevention and control. Plotting graphs is important but more importantly is the interpretation of the graphs for decision making. The 46% who said they use the data for monitoring trends is still far too small a number. If more people cannot interpret the data for prevention and control, the prevalence of outbreaks will likely continue to be high. The more people capacitated to use surveillance data for decision making the more efficient becomes the system.

A follow up to the use of Malaria Surveillance data reviewed that the prevalence of meetings on the use of the surveillance data was very low. This is indicated by the only 5 out of the 12 clinics (41.67%) having minutes of the previous meeting on malaria surveillance data. Although the respondents had said that Malaria data is useful the low prevalence of reports shows that there is little being done to use the data in planning at rural health centre level.

In addition, of the 12 clinics, the 12 respondents were asked on whether they ever recorded any outbreaks in this 2015, eleven said they never did, but the malaria threshold graphs shows that a total of 3 clinics had recorded outbreaks. Such a difference shows that although some health centres have been producing Malaria threshold graphs they are still not able to interpret them to detect outbreaks. Some health workers actually said that they wait to be informed from the district level on whether they are in an outbreak or not.

Review of the WDSS 2015 reports and Malaria threshold graphs shows that there is one health centre (Kopera Clinic) that has been recording Malaria outbreaks from week 11 to week 28. One of the key functions of surveillance data is early detection and management of outbreaks. So the persistent outbreaks may be an indicator of a limited use of surveillance data. In a case of functional surveillance system the alert values should stimulate action to prevent further occurrence of outbreaks.

The findings of this study are contrary to a study by Dr. Ingrid Brigitte Weber in the evaluation of the notifiable disease surveillance system of Gauteng Province in South Africa, 2007. In this study respondents pointed out that the surveillance data had been used to change policies and procedures. The changes included the tabling of schedules for regular infection control and environmental audits duties, respondents at district level also showed that follow up investigations and disease control measures also come up from such data.

Simplicity of the Malaria Surveillance system:

All the respondents 27 showed that the Malaria surveillance system was so easy to operate. However some participants pointed out that although the system is simple they need a formal training to operate the system. The evaluation also brought out that the main tasks of the health workers are tallying on the tally forms, plotting graphs, displaying data at the health

centre, feed back to the communities and meeting reporting deadlines. The fact that all the 12 Health centers were meeting their reporting deadlines shows that they find the system simple to operate as well.

Such a high simplicity of the system is in line with the fact that Malaria surveillance training was carried out at all levels in Zimbabwe. This was to enable health workers to be able to detect and respond to Malaria epidemics amongst other epidemic prone diseases. Malaria thresholds were calculated for all the health facilities with the support from the district offices. The national level supported the pre-season assessment to determine level of preparedness and resource mobilization, (The Zimbabwe Malaria strategic Plan, 2013).

Similarly, in the evaluation study of the Gauteng Province in South Africa, all the health workers were also able to draw a flow diagram of reporting notifiable diseases within their geographic surveillance system. Their surveillance system was also easy to operate hence they could recall most key elements.

Flexibility of the Malaria Surveillance System:

According to the Zimbabwe Malaria Strategic Plan, 2013 Malaria case reporting is carried out using the health information management system (HIMS). Malaria is reported weekly, monthly, and quarterly. The data since 2005 is now being collected by age and gender. The WDSS captures information on Malaria and other epidemic prone disease such as Cholera, anthrax, plague and diarrhoea.

All the interviewed health workers (27) agreed that the Weekly Disease Surveillance system is flexible in reporting malaria and other health events. Most workers (88.9%) reported that they learnt to operate the surveillance system through on job training. This may be attributed to their finding it easy to operate the system since this was something learnt on daily basis. Above half of the participants said they learnt of the system through on job trainings and workshops related to the field.

The findings of this study are different to the findings in the evaluation of notifiable disease surveillance conducted in Beitbridge in 2015. In this study the majority of the respondents (89%) had never filled a T1 form and did not know what it looked like. Amongst those that used it 6(11%), four (4/6) said that it is flexible allowing for change and adding other diseases which are not on the form. However if 4 out of 6 of the people who used the form testified that the forms are flexible and easy to use this may also help to explain why in this study most people who got on job trainings have no problems in using the system.

Acceptability:

The majority of the respondents 26 out of 27 respondents said they participate in malaria surveillance but they have different roles in the system. The majority of people 20 out of 27 said they are responsible for data tallying and only 1 out of 27 said they are responsible for dissemination of reports and giving feedback. In most rural health centres there are 2 health workers on duty the nurse and the nurse aid. All the two reviewed that they are interested in participating in the surveillance system and they see it as part of their job.

These findings show a higher acceptability of the surveillance system compared to the findings of the evaluation of notifiable disease system in Beitbridge, 2015. The Beitbridge district evaluation showed that (46) 87% were willing to participate in the T1 forms.

Generally this can also be the reason why the health workers find the tools simple to use, when one is willing to participate in a system chances of developing ability of easy use are high too. The reason that 1 out of 27 health workers expressed unwillingness could be that his duty is Primary Care Counseling hence he has less

involvement in notifiable disease unlike Nurses and Nurse aides.

Stability:

The malaria surveillance system of the district is stable to some extent, however there are still some notable gaps. Presence of New Malaria case definition, of the 12 Health centres, 10 (83.3%) had displayed IEC materials showing the new Malaria case definition. This is a key instrument that should be available in all health centres hence its unavailability may also negatively affect active malaria case detection.

Out of the 12 health centres one of them had no surveillance forms, the clinic is Mooplats clinic, the reason is because Mooplats is a satellite clinic of the wattle company clinic hence all the cases received are reported to the main clinic whilst this serves as satellite. The satellite clinic is only manned by 1 nurse aid and it has a limited resources.

In addition 4 out of 12 clinics (33.3%) do not have functional cell phones. Cell phones are used to transmit malaria data from the health centre to the district hence their absence affect timeliness of reporting. Functional cell phones are also key for feedback from the district or national level. This may also be the reason of the slight decline in timeliness in the district for the period week 1 to week 7 to week 29.

Apart from functional cell phone, only 1 out of 12 Clinics have a functional radio communication system. It seems most radio systems have since broken down hence they are no longer fit for communication. Such systems could be very useful in areas were cell phone networks are a challenge.

Consequently only 1 out of the 12 health centres had functional internet services. Internet is another fastest way of sending data and receiving feedback. There will be more need to scale up coverage of internet services to other health facilities.

Lastly, communication break downs were reported to be a common scenario by 14 out of 27 respondents. The major sources of breakdowns are cell phone network or electricity challenges for the cell phone and technical challenges with the cell phone.

Timeliness:

Timeliness at district level has improved significantly from week 7 to week 28, but there were challenges from week 1 to week 6. An interview conducted with the District Health Information Officer (DHIO) reviewed that timeliness of data is also affected by the fact that the server is centralized in Harare such that data sent from the Health facilities goes straight to the server. There is little room for data verification at district level before the deadline. Hence when an error is identified for rectification from the server resubmission will automatically be after the deadline thus affecting timeliness.

In addition, easy availability of airtime for the DHIO also affects timeliness of data. Although there is a budget for emergencies in the district there is no budget specifically for the surveillance system. Consequently the interview reviewed that the process of requesting for airtime by the DHIO is long and laborious such that this also affects timeliness and completeness of data.

On the other hand, a significant fraction of the respondents said that sometimes they fail to meet reporting deadlines. The major reasons pointed out are too much workload and others attributed it to communication breakdown due to cell phone network or electricity challenges.

The challenge on failure to meet reporting deadlines by the VHWs can affect timeliness and completeness of the malaria surveillance system, Hence there is also need to reinforce the importance of meeting reporting deadline by the VHWs. This is key for outbreak investigation and management.

Completeness:

Completeness of reports is at 100% at district level as from week one of 2015, however there are still some gaps in completeness of data at health centre level

for easy detection of outbreaks. The Malaria threshold graph is a very important tool in malaria outbreak investigation and management hence it has to be accurately presented. Out of the 12 Health centers only 11 had Malaria threshold graphs displayed on the wall, only 8 (66.7%) had updated actual and action values. Four (4) health facilities were without updated actual values to week 28 hence risking or limiting their ability to detect outbreaks.

The other challenge that was noted was that of the 51 out of the 52 clinics that are supposed to report weekly only 50 are reporting regularly. The Clinic that is not reporting is known and meetings are still underway to engage the clinic. Although efforts are underway to engage the clinic in reporting this still remains a risk of unreported outbreaks in the district.

Malaria surveillance is affected by the flow of reports from the Village Health Workers (VHWs), the cadres have been tasked to conduct Malaria Rapid Diagnostic Tests (RDT) and treatment at community level hence their reporting is very important. According to the Malaria report of Manicaland Province week 28, the VHWs reporting has been very low (59.3%) hence affecting completeness of reporting, (Chipinge district, VHWs reporting completeness, 2015).

Feedback:

There is a high evidence of feedback between the district and the health centres in the form of texts, phone calls, and meetings. However there is a gap of the absence of a spot maps that shows distribution of Malaria and other health events, only 3 out of the 12 Clinics had such a spot map. A spot map showing distribution of health events is informative feedback to clients for preventive measures. In addition this will also alert the health workers especially new workers to be very sensitive to clients from Malaria prone areas.

Data Quality:

Following the question on whether the respondents sometimes errors in data entry, the majority (70%) said No whilst 17% said yes and they make errors sometimes but not always. So there is room for errors in our data hence the need to decentralized the server system and create room for rectifications at district level.

In terms of data verification before final sending of data to the next level the findings of this report are slightly higher to the findings of the evaluation of notifiable diseases surveillance in Shamva, by Maponga Et al, 2015. In the study 62% of the respondents said they check for errors before data is send to the next level. This report shows that 77.8% (21) said the reports are checked before final sending. Data verification before sending is key to reduce errors which result in the reports being send back for rectification and reducing timeliness of data.

CONCLUSION

The Malaria Surveillance system of Chipinge district is acceptable, flexible, useful and simple. However, the system has some limitations on usefulness, stability, timeliness and completeness of VHW reports. Some health workers at health facility levels are not yet able to interpret the surveillance data for early detection and management of outbreaks hence they wait to be informed from the district.

Usefulness, the malaria surveillance data is supposed to be used to avoid consecutive occurrence of malaria outbreaks. Out of the 12 health facilities, Kopera Clinic has continued to record malaria from weak 11 to week 28. The alert values on the malaria threshold values should be used as an early warning to stimulate action to prevent occurrence of an outbreak.

The centralization of the data server also affects the timeliness of data by reducing data verification at district level, hence queries are send down from the national level. The rectified data is resend to the national level after the deadline hence affecting timeliness.

Stability, although the 4 out of 12 health centres which do not have functional

cell phones are using personal cell phones to communicate there is need to rectify the challenge. In addition there is also need to find a sustainable source of airtime for the health centres and the District Health Information Officer to transmit data and give feedbacks.

Completeness of VHW reports, Malaria surveillance is largely affected by flow of VHWs' reports since the VHWs are responsible for community Malaria RDTs. The completeness was at 59.3% so there is more need to capacitate the Village Health Workers to report in time.

Limitations of the Study:

The ZRP Support Unit Clinic was part of the study population but efforts to conduct interviews with the health workers were fruitless. The requests to do interviews were turned down for security reasons which were not disclosed.

Dissemination of Results:

A PowerPoint presentation of results was made in the district health team meetings. Amongst the participants were the DHT member, the District Health Officer, The District Health Services Administrator, the District Nutrition Officer, District Nursing Officer and Others. The findings were also presented in the Nurses meeting at district level were Nurses from the respective Health Centres were present.

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