



MAM@Scale Midline Survey



Report

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Acronyms

ARC	Artesunate Rectal Capsules
BA	Bicycle Ambulance
CF	Community Facilitators
CHAs	Community Health Assistants
CHVs	Community Health Volunteers
CHW	Community Health Worker
CMS	Community Monitoring System
COVID-19	Coronavirus Disease 2019
DHMT	District Health Management Team
ETS	Emergency Transport System
GBV	Gender Based Violence
GCC	Grand Challenges Canada
HF	Health Facility
HMIS	Health Management Information System
IEC	Information, Education and Communication
Inj AS	Injectable Artesunate
MAM	MAMaZ Against Malaria
MAM@Scale	MAMaZ Against Malaria at Scale
MMV	Medicines for Malaria Venture
MOH	Ministry of Health
NMEC	National Malaria Elimination Centre
NSU	National Scale-up
PMI	President's Malaria Initiative
QA RAS	Quality Assured Rectal Artesunate
RAS	Rectal Artesunate
RHC	Rural Health Centre
RHP	Rural Health Post
SMAGs	Safe Motherhood Action Groups
SPSS	Statistical package for social scientist
WHO	World Health Organisation

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Executive summary

Background to study

The MAM@Scale project is a scale up of the pilot project which was carried out in Serenje district between July 2017 and July 2018. The main objective of conducting the midline review was to gauge progress to date of the MAM@Scale activities. The results in this report reflect progress part way through implementation of the project (the current phase of the project ends on 30 November 2020). The review was carried out in selected project areas to review progress in achievements and assess the possible change that can be attributed to the project, particularly with regards to management of cases of severe malaria. The review was conducted in June and July 2020.

Methodology

Data was collected from the demonstration districts (high coverage project districts), namely Chitambo and Serenje, and the National Scale Up (NSU) districts (additional districts with more limited coverage), namely Chama, Manyinga and Vubwi. Data was collected using two unique tools i.e., health facility (HF) and community health volunteer (CHV) tool as in the baseline survey. The NSU districts were not included in the baseline survey and therefore there is no comparison data for them. The survey targeted a total of 40 HFs but 48 HFs were eventually visited. A total of 720 CHVs were reached during the survey instead of the targeted 776, including 532 from demonstration districts and 188 from NSU districts. It was planned to include more CHVs in the NSU districts, however, the calculated sample sizes exceeded the actual number of trained CHVs in these districts. Therefore, additional CHVs were identified in the demonstration districts to compensate but these did not make up the initial target number.

Findings

Improvement in knowledge level of severe malaria and confidence to administer RAS

More CHVs at midline were significantly more knowledgeable about the causes of malaria than at baseline (99.7% vs 71.1%). This can be attributed to the training conducted for CHVs under the project. The proportion of female CHVs who knew the danger signs of severe malaria in children significantly increased ($p < 0.05$) from baseline (72.6%) to 99.7% during midline. The RAS trained CHVs were asked if they feel confident to administer RAS: 98.3% (N=428) of the CHVs at midline mentioned that they feel confident enough to administer RAS. This proportion is significantly higher than the baseline proportion (42.7%). Despite the high confidence levels for the administration of RAS, some of the CHVs faced challenges in administering it to children. However, there was a significant decrease in the proportion of CHVs who were having challenges in the demonstration districts from baseline (34.9%) to midline (14.7%). In addition, more males (19.9%, N=226) than females (13.1%, N=237) faced challenges in administering RAS in the demonstration districts. One of the challenges is that of parents refusing to have RAS administered to their children. The results show that the proportion of CHVs who mentioned parent refusal dropped significantly by 13.1 % points from 17.6% (n=74) during baseline to 4.5% (n=5) at Midline. In these cases CHVs are trained to work with a child's carers so that they safely administer the RAS.

Drug availability at health facilities

Overall drug availability has improved at health facility level. Of the five malaria drugs assessed, more health facilities at midline than baseline (41.7% vs 35.5%) had at least 80 percent (at least four of the medicines) available on the day of the survey. Coartem remained the most available drug at both baseline and midline. Injectable Artesunate (Inj AS) was the least available (available at less than half of the facilities, 47.9%) at midline as compared to Rectal Artesunate (RAS) which was least available at baseline. In the demonstration districts, the average number of boxes of 60mg Inj AS dropped from 19 to 18. However this was much better than the NSU districts where eight boxes of Inj AS, on average, were reported for each facility. Although the findings indicate that Inj AS was the least available during the survey, it is imperative to acknowledge that in general, the availability of this drug has improved. Shortages at the time of the survey can be attributed to distribution challenges due to COVID-19. Project information from the districts show that the stocks of Inj AS have since improved and are now stable. However, concerns have been raised on other platforms and this necessitates continued close monitoring of the situation and coordination with NMEP, DHMT and the Global Fund. These findings show that there is scope for further improvement in malaria drug supplies so that a higher proportion of health facilities have essential malaria drugs available at all times.

Availability of at least one staff member trained on Injectable Artesunate administration

All HFs assessed in the NSU districts had at least one staff member trained on Inj AS administration. There were slightly fewer HFs in the demonstration districts at midline that had at least one staff member trained on Inj AS as compared to the baseline. Furthermore, there was a higher proportion of HFs in the NSU districts that have at least one staff member trained to administer Inj AS as compared to the demonstration districts. The reduction could be due to routine rotations of staff. Separately, it is worth noting that NSU districts had a higher overall percentage of HFs who have staff who need training on the management of severe malaria.

Case management of malaria

More CHVs in the demonstration districts indicated that they have managed cases of severe malaria at midline (93.1%) as compared to baseline (79.2%). Serenje registered a 23.3% point improvement, while Chitambo improved by 11.6% points. At midline, more CHVs in the demonstration districts (93.1%) managed cases of severe malaria as compared to NSU districts (89.2%). The proportion of CHVs, in demonstration districts, who have referred children significantly improved by 34.8 percentage points from 56.3% (N=213) at baseline to 91.1% (N=474) at midline. The increase in referrals was confirmed by HF staff who indicated that cases of severe malaria which were referred from the community by CHVs increased more than sevenfold from baseline (191 cases per year) to midline (1400 cases per year). It should be noted that the review included 58% of intervention health facilities in Serenje and 71% of those in Chitambo. Most of the CHVs (82.1%, N= 430) indicated that they use pages from CHV notebooks as referral letters, which is different from baseline where many of the CHVs used nothing (40%, N=120). Similarly, the use of counter-referral forms at HFs improved by 257% with 805 cases issued with counter referral forms during baseline compared to 2072 at midline. Also, the survey reveals that a high proportion of CHVs (82.3%, N=413) mentioned that they do follow up visits to the patients.

Follow-up of severe malaria cases

A greater proportion of the CHVs at midline (82.3%, N=413) mentioned that they always follow up severe malaria clients. There is a significant improvement compared to the baseline (66.7%, N=27). The results

also show an improvement in the number of times CHVs make follow up visits on their clients from baseline (44% mentioned twice) to midline (58.6% mentioned three times). In Serenje, the proportion of CHVs who make follow up visits three times improved from 20% at baseline to 60.4% at midline. Similarly, in Chitambo CHVs who said that they made three follow up visits improved from 33.3% at baseline to 56.6% at midline.

Use of the ETS

Overall, ETS riders are travelling an average distance of 11.3 km from the central part of their communities to the nearest HFs at midline when the two demonstration districts are combined. This is significantly different from the average of 10.5 km which was mentioned by ETS riders at baseline. However, the ETS riders in Serenje travel significantly longer distances (12 km) than ETS riders in Chitambo (8 km). The opinions of the ETS riders about the usage of BAs have not changed from the baseline as they continue to feel that the BAs can be used for both maternal and child health emergencies. The ETS riders have remained motivated to do their work although they have to ride long distances to HFs, the road network is poor, and they lack torches to enable them to work at night.

Changes in gender empowerment

A total of 97.8% (N= 268) female CHVs felt that they have a stronger voice at community level because of trainings. This comprised 97.9% in demonstration districts and 96.2% in NSU districts. Furthermore, most of the CHVs, 91.9% (90.3% males and 94.4% females) felt that female community members have more independence to make health and other decisions within their households because of the community mobilization activities in their communities. There were more CHVs (94.6%) in the demonstration districts who thought that female community members have more independence to make health-related decisions than in NSU districts (84.0%).

In terms of the CHVs' perceptions about fewer children facing delays in going to the health facility when they are suspected of having malaria, the proportion increased significantly ($p < 0.05$) from baseline (75.0%) to midline (78.4%) within the demonstration districts. The results also show that more CHVs in demonstration districts (78.4%) than CHVs in NSU districts (50.9%) felt that fewer children are facing delays. In addition, more CHVs (78.9%) in the demonstration districts thought that families are less reliant on traditional medicine at midline which is significantly different from 75.0% at baseline.

Impact of COVID-19 on service provision

A total of 84.1% of HFs mentioned that they have experienced disruptions in supplies of medicines and other essential services as a result of the COVID-19 pandemic. In addition, 61.4% mentioned that they have scaled down activities. There has been a notable change in the volume of people accessing growth monitoring and this was reported by 25% of the surveyed HFs. Reductions were also registered in the volume of people accessing child health clinics and immunisations. The reduction was reported by 23.3% of the health facilities that were surveyed. COVID-19 was also found to be posing challenges for CHVs at community level. A total of 30.4% (42.3% NSU districts and 26.5% demonstration districts) mentioned that they were facing challenges. Eighty-one percent (81%) mentioned that they were unable to do as many household visits and community meetings as they would have desired due to restrictions that are in place to curb the spread of coronavirus.

Incidence of malaria in the project districts

Malaria cases captured in the midline survey increased by 45.7% (32,251) from 70,563 in the demonstration districts to 102,814 from the year 2018 to 2019. This is largely due to the higher number of HFs surveyed in the midline review compared to the baseline survey (26 versus 17). The malaria cases in 2019 peaked between January and June. Also, severe malaria cases among children under 5 years in the HFs surveyed in the demonstration districts increased by 62.2% (435) from 699 in 2018 to 1,134 in 2019¹. However, the proportion of reported simple malaria cases progressing to severe malaria decreased from 2.17% to 1.10%. Just like the malaria cases, the peak of the severe malaria cases for children under 5 years was recorded between January and June 2019.

Mortality rates due to severe malaria in children

A total of 10 deaths out of 1,134 cases of severe malaria were recorded during the period of January to December 2019 among the HFs that were visited in the demonstration districts. Case fatality of 0.9% in the demonstration districts was noted and this was significantly lower than the baseline findings (3.1%). Further analysis shows that there was much improvement in Serenje district as case fatality declined from 2.1% to 0.3%. In Chitambo case fatality dropped from 3.4% to 1.5%.

Conclusions and recommendations

The midline survey was successfully carried out and highlights some important issues especially as preparation for the next project phase is underway.

Conclusion 1: The project has achieved significant results in improving knowledge about simple and severe malaria among CHVs. This is critical for the speedy identification of cases and the ultimate success of the project. The very high knowledge levels in Serenje provide evidence of the effectiveness of project strategies over time. Similarly, confidence levels have gone up among CHVs on the administration of RAS. The combination of high knowledge levels and high confidence levels offers a good platform for addressing future cases of malaria and averting possible deaths especially in children in the project areas. This is further enhanced by the notable improvements in the referral systems and subsequent follow-up of clients. Challenges due to external and internal factors were shared by CHVs and these need to be addressed appropriately.

Recommendations:

- *The work carried out by the CHVs is commendable and as such there should be support from the project in terms of further assessing the challenges they have highlighted. The project can address challenges that are within the project's mandate and highlight those that are external to the project with relevant stakeholders.*

¹ The figure is lower than what has been reported by CMS data because data was only collected from a sample of HFs within the demonstration districts.

- *Challenges encountered by a small number of CHVs in administering RAS need to be addressed for better outcomes of the project.*
- *The assumption made by the project that carers can administer RAS under the guidance of CHVs needs to be further evaluated to determine its relevance especially in the light of the results of this study.*

Conclusion 2: Results show that overall, there are improvements in terms of availability of at least one staff member trained on Inj AS. The reduction in the percentage of trained staff especially in the demonstration districts needs to be carefully monitored. Although all HFs in NSU districts have at least one staff member trained on Inj AS, there are staff members who still require training or have no experience in terms of managing cases of severe malaria.

Recommendations: *The reduction in trained staff, coupled with the presence of staff who have not been trained on how to handle cases of severe malaria calls for more training sessions if resources permit. The results should also be shared with the DHMTs so that they are aware of the situation and understand the implications.*

Conclusion 3: The project has been intervening at facility level to optimise case management of severe malaria and increase access to Inj AS at HFs. In all the districts, although >40% of the visited health facilities had all the five malaria drugs available at the time of the survey, Inj AS was limited in supply. However, project information from the districts show that the stocks of Inj AS have since improved and are now stable.

Recommendation: *The project has to continue monitoring the availability of Inj AS and engaging relevant authorities especially NMEP in an effort to avert possible shortages especially in the project districts. These efforts should ensure a regular inbound supply of Inj As into Zambia and onwards distribution to district stores. HFs should consider keeping additional buffer stock of supplies with adequate expiry dates to minimize the risk of stock outs during the pandemic. There is also room to improve the supply / stock levels of essential malaria drugs more generally since these have been affected by the COVID-19 pandemic.*

Conclusion 4: The ETS is working well and ETS riders have continued to provide an essential service in their communities. This is despite the long distances and poor terrain that they have to navigate. The riders have remained passionate about their work even though they have difficulties working at night and during the rainy season.

Recommendation: *Provision of necessary items like torches and raincoats to those still in need will go a long way in encouraging riders to effectively continue their activities even during the rainy season and at night.*

Conclusion 5: There have been significant positive changes in gender empowerment generally and in the social inclusion of disadvantaged women and their families. Having more female CHVs with a stronger voice in their communities is an enabling factor for the ultimate achievement of the project goal and this

also opens up other development opportunities for women. This is further complemented by more women being able to make health related decisions at household level. It is not surprising that there are fewer delays in sending children to HFs for further treatment. In relation to social inclusion, the evidence points to the fact that CHVs are taking proactive steps to include the least-supported women and children in their activities. This is important since it is this group that tends to carry the highest burden of mortality and morbidity.

Recommendations: *CHVs including ETS riders should continue with their commendable efforts of reaching out to all those who need their assistance and ensuring inclusion of the most vulnerable and excluded individuals.*

Conclusion 6: As would have been expected, COVID-19 is having a negative impact on service provision at both health facility and community levels. Although some activities are happening at a lower scale, it is pertinent to note that strategies are in place to continue engaging at household and community levels. RAS is still being administered to save lives, but concerns have been raised regarding the lack of PPE for CHVs. The volume of people seeking pre- and post-natal services for themselves and their children has gone down.

Recommendations:

- *Appropriate PPE would enable the CHVs to administer RAS without necessarily asking the child's carers to administer it and should be provided where feasible.*
- *HFs should come up with innovative strategies of providing essential services during these COVID-19 times so as to avoid an increase in morbidity and mortality among catchment populations. The results of this study, which show a decrease in provision of essential health services, can be used as a basis for lobbying for the adoption of innovative approaches for service delivery.*

Conclusion 7: There is a reduction in child mortality due to severe cases of malaria. This is likely to be attributable to the positive changes brought about by the project as it is more apparent in the demonstration districts where there is a much higher coverage and longer engagement. This is a good position as the project prepares to transit to the next project phase.

Recommendation: *Continue with the planned project implementation as strategies are bringing about the desired change and advocate with the MOH and NMEC to allocate resources for further expansion of RAS across the country.*

DASHBOARD July 2020

Note that the results in the dashboard reflect progress part way through project implementation.

Indicator	Project Target	Baseline (February 2019)	Midline (June to July 2020)	Data Source(s)
# lives saved among children aged 6 months to 6 years old	636		193 ²	HMIS, Outpatient Registers at health facilities
# RAS beneficiaries (children aged 6 months to 6 years)	7,621	1,279	Total - 3,216 ³ Demo – 2,993 NSU - 619	Community Monitoring System (CMS) Data-End of July 2020
# intervention communities using innovative product	120		Total - 351 Demo - 180 NSU - 171	Community Monitoring System (CMS) data
# (%) HWs trained in SM case management who manage cases	80		Serenje -98% Chitambo – 98% Manyinga – 98% Chama -98% Vubwi – 99%	Health facility staff records
# (%) CHVs trained in SM case management who manage cases	1,440	79.2% (xxx)	Total - 94.4% (1667) Demo – 93.1% (1,417) NSU – 89.2% (220)	Baseline and midline survey
# HWs trained in SM case management	100		Total – 238 Demo – 157 NSU – 81	Community Monitoring System (CMS) data
# CHVs trained in RAS administration and referral	2,000		Total – 1,810 Demo – 1,448 NSU – 362	CHV training report July 2020
(%) HWs confident to deal with SM cases	80		Serenje -98% Chitambo – 98% Manyinga – 90% Chama -100% Vubwi – 98%	Baseline and midline Surveys
# (%) CHVs confident to deal with SM in children	1,600 80%	Demo-91(42.7%)	Total – 643 ⁴ (97.4%) Demo – 467(98.3%) NSU – 176 (95.1%)	Baseline and midline Surveys
# full-time jobs created by project in Zambia	5	5	6	Community Monitoring System (CMS)
# part-time jobs created by project in Zambia	4	4	13 ⁵	Program Documents (Contracts)

² proportion of cases progressing to SM was lower, hence lowering this number

³ The number of RAS beneficiaries were significantly lower than the targeted number because fewer than anticipated cases of simple malaria progressed to severe malaria. CHVs diagnosed cases of simple malaria and treated it with ACTs in the community promptly before progression to severe malaria.

⁴ If this number was extrapolated to the entire project coverage area, the number would be 1,607 CHVs

⁵ 9 Community Facilitators, 1 Finance Officer, 1 Donor Liaison Officer, 2 District Consultants.

# outreach or awareness activities conducted	1		1	Community Monitoring System (CMS)
# beneficiaries reached via outreach or awareness (children 6 months - 6 yrs.)	39,500		67,968	Community Monitoring System (CMS)- July 2020
# community members reached via outreach or awareness activities	115,476		224,000	Community Monitoring System (CMS)- July 2020
Influence / contribution to a change in policy, procedure, or legislation	Yes			Design Mission, Baseline, midline and CMS
# (%) female CHVs	50%		Total – (834) 47% Demo – (268) 51.8% NSU – (49) 19.8%	CHV training report February 2020
# (%) female ETS riders	15%		34%	ETS training report (February 2020)
# (%) female CHVs with improved severe malaria knowledge	80%	(143) 72.6%	Total - (293) 99.7% Demo - (259) 99.7% NSU – (34) 100%	Midline survey
# (%) female CHVs with confidence to administer RAS	80%	(52) 43.3%	Total – (233) 95.5% Demo – (206) 97.2% NSU – (29) 85.3%	Midline survey
# (%) female CHVs reporting that they have a stronger voice at community level	70%		Total – (262) 97.8% Demo – (237) 97.9% NSU – (25) 96.2%	Midline survey
# (%) of female community members indicating that they have improved scope for decision-making within the households	70%		Total – (253) 94.4% Demo – (228) 94.2% NSU – (25) 96.2%	Midline survey

1 Introduction

This report presents the results for the Midline survey for the MAM@Scale project which was carried out in June and July 2020. The MAM@Scale project is a scale up of the pilot MAMaZ Against Malaria (MAM) project which was implemented in Serenje district between July 2017 and July 2018. The main objective of conducting the midline review was to gauge progress to date of the MAM@Scale activities. The survey captured progress with the project part-way through implementation. The project began on 1st December 2018 and ends on 30th November 2020.

1.1 Background

Since 2017, Zambia has been seeking to eliminate malaria. Efforts in this regard are guided by the National Malaria Elimination Strategic Plan for the period of 2017-2021⁶ that was adopted by the Government of the Republic of Zambia in 2017. The plan has a vision of a malaria-free Zambia and aims to ‘move from accelerated burden reduction to malaria elimination in Zambia.’ It seeks to achieve this by eliminating local malaria infection and disease in Zambia by 2021, maintaining malaria-free status, and preventing reintroduction and importation of malaria into areas where the disease has been eliminated. An important element in the country’s approach to eliminating malaria includes effective case management strategies that focus on treating detected cases. Timely diagnosis and effective treatment are regarded as a first step in reducing the country's malaria burden.

MAM@Scale was awarded a ‘transition to scale grant’ by Grand Challenges Canada (GCC) in 2018. This supports innovators to “take their bold ideas to big impact in the area of global health.” The innovation is an approach that increases the access of children aged six months to six years old to a pre-referral intervention for severe malaria (i.e. rectal artesunate - RAS⁷) and supports their referral to HFs that are equipped to provide quality case management of severe malaria. The innovation is suitable for hard-to-reach areas where communities commonly experience delays in reaching a health facility. Building on the results and learning from the MAMaZ Against Malaria pilot project, implemented in Serenje District, Central Province over the period July 2017 to July 2018, MAM@Scale is working with government partners to prepare the way for the future national scale-up of pre-referral RAS in Zambia. MAM@Scale began on 1st December 2018. The project has been operational for 18 months and was initially set to end on 30 May 2020. Due to the COVID-19 pandemic which has affected Zambia, the project has applied for a no-cost extension for a maximum of six months (i.e. from June to November 2020). The goal of the project is:

To support the scale-up of an evidence-based intervention that aims to increase the access of hard-to-reach communities to effective treatment for severe malaria in high malaria burden settings.

The project is implemented by a consortium comprising Development Data Zambia (project lead), Transaid (UK), DAI Global Health (UK) and Disacare (Zambia). All four organisations were involved in the design and implementation of MAMaZ Against Malaria which was led by Transaid, the MORE Mobilising

⁶ <https://www.nmec.org.zm/malaria-elimination-strategic-plan>

⁷ The preferred name recently changed to Artesunate Rectal Capsules (ARC). However, the term used in Zambia by NMEC, health workers and CHVs is ‘RAS’.

Access to Maternal Health Services in Zambia Programme (MORE MAMaZ), led by Transaid and funded by the UK charity Comic Relief (2014-2016) and MAMaZ, led by Health Partners International (now part of DAI Global Health) and funded by the UK Department for International Development.

The project's core intervention districts are Serenje and Chitambo in Central Province. Both districts participated in MAMaZ and MORE MAMaZ, and Serenje District was the sole intervention district in MAM. MAM@Scale is also providing light support to three additional districts namely Manyinga, Vubwi and Chama in the first phase of scaling up the innovation, with support from other partners.

1.2 The malaria context in Zambia

Zambia's entire population of 17.35 million people is categorised as at high risk of contracting malaria, leading to an estimated 2.7 million cases in 2018⁸. Despite concerted efforts by the National Malaria Elimination Centre (NMEC), Zambia reported an increase in cases between 2017 and 2018 (from 2.697 million to 2.719). The World Malaria Report 2019 estimates that 7,419 Zambians lost their lives to malaria in 2017 and 7,519 in 2018⁹. In contrast, the National Health Management Information System (HMIS) reported 1,425 malaria deaths in 2017. The higher WHO figure includes an estimate of malaria deaths occurring at community level out of sight of the formal health sector. *P. falciparum*, the species of plasmodium parasite that causes the most lethal form of malaria, accounts for an estimated 98% of malaria cases in Zambia¹⁰. Central Province has a malaria parasite prevalence rate of 13.8%.^{11,12}

In Zambia, as in other countries with a similar malaria burden, reducing malaria-related mortality requires a stronger focus on areas where mortality is highest. This includes addressing severe malaria. An estimated 5-7% of malaria cases progress to severe malaria. Epidemiologically, children under five years old are the age group most susceptible to severe malaria due to a lack of immunity. Severe malaria is defined by clinical or laboratory evidence of vital organ dysfunction. In a community setting, severe malaria can be recognised via observation of danger signs (fever plus one or more of the following: inability to eat or drink, repeated vomiting, convulsions, or lethargy or unconsciousness). In practice, many cases are missed. Severe malaria can quickly become fatal if left untreated.

Quality-assured RAS (100 mg) has been included in Zambia's national Guidelines for the Treatment of Malaria. The pre-referral intervention is seen as a complementary intervention to support children with severe malaria in hard-to-reach communities that struggle to reach their nearest health facility (HF) quickly in the event of a health emergency. Although introduced into the national strategy, when MAM started RAS had not yet been introduced in Serenje District. Inj. AS, recommended by WHO as a treatment for severe malaria at referral facilities, has been adopted into the national strategy since 2012. While Inj.

⁸ WHO, 2019, World Malaria Report 2018, Geneva.

⁹ WHO, 2019, World Malaria Report 2018, Geneva.

¹⁰ National Malaria Elimination Centre, National Malaria Elimination Strategic Plan, Ministry of Health

¹¹ Ministry of Health and Central Statistical Office, 2015, Zambia National Malaria Indicator Survey, 2015. Lusaka: Government of Zambia.

¹² The malaria parasite prevalence rate is based on the percentage of children under five years old with malaria parasites read by microscopy.

AS had been introduced at District Hospital level in most of the country, it was not available at lower levels of the health system, including the MAM intervention HFs.

1.3 MAMaZ Against Malaria (MAM@Scale)

The project is being implemented in two core demonstration districts (Serenje and Chitambo) and three other expansion districts (Manyinga, Vubwi and Chama). Sustainable delivery of MAM@Scale within Zambia is implemented via government uptake and long-term support of MAM@Scale through the Zambian MOH, local district governments, and the National Malaria Elimination Centre. The objective of the work being conducted under this grant agreement is to leverage support from all government partners to work with the MAM@Scale team to gradually expand the programme nationwide.

The MAM@Scale project was adapted from the pilot project which used a comprehensive and innovative 'end-to-end' approach. This approach mobilises communities around a severe malaria agenda and connects communities to HFs ensuring the continuum of care and that severe malaria case management is completed, adequate follow-up is provided, and that the health system is fully responsive to beneficiary needs.

MAM@Scale increases access to quality-assured RAS in community-based settings in Zambia to ensure that children with suspected severe malaria are receiving immediate antimalarial pre-treatment prior to referral to a health care centre. The partnership with MMV ensures procurement of high-quality RAS through two pharmaceutical partners, Cipla and Strides Shashun. The MAM@Scale programme ensures quality assured RAS is available at the community level (through distribution partnerships with district governments), trained community health volunteers (CHVs) on the diagnosis of severe malaria in the community setting, and in the administration of RAS for suspected severe malaria cases.

Table 1: Projected Total Population Coverage of MAM@Scale¹³

Comparator		MAM		MAM@Scale				
		Serenje	Serenje	Chitambo	Manyinga	Chama	Vubwi	Total
Population Coverage (demonstration sites)		54,000	78,181	49,917	-	-	-	128,098
Population Coverage (low intensity approach)		-	30,000	2,000	59,000	30,000	35,000	156,000
Total Population Coverage		54,000	108181	51917	59,000	30,000	35,000	284098
% total population		37% ¹⁴	74%	80%	93%	19%	63%	76%¹⁵

¹³ In July 2020, further training was delivered in Chama district. The population coverage for this district has increased since the midline review was implemented. This will be reported in the endline survey report.

¹⁴ In MAM, the district population was lower, and this percentage was therefore 40%.

¹⁵ Note that this figure would be 90 percent if the i-CCM volunteers are able to reach / serve their entire catchment populations.

Intervention HFs (high intensity approach)	8	16	13	-	-	-	29
Intervention HFs (low intensity approach)	-	9	1	11	5	12	38
Total HFs	8	25	14	11	5	12	67
% Total HFs	33%	96%	100%	100%	100%	100%	97%

Through trained CHVs, children with severe symptoms who cannot take oral medication are given a rectal capsule, which ensures they are receiving immediate pre-referral intervention with an antimalarial before they are referred to a health facility. The programme also facilitates emergency transportation of patients with severe malaria from the community to referral HFs for follow-on treatment, through a system of bicycle ambulances with trained riders. At health care settings the MAM@Scale programme trained health care providers in the diagnosis and case management of severe malaria in children.

MAM@Scale was set to deliver impact by:

- expanding project operations from one to five districts and therefore creating a substantial increase in population coverage
- training CHVs in severe malaria
- training over 100 front-line health providers in severe malaria case management in five districts,
- procuring adequate supplies of RAS for over 7,000 beneficiaries by the MOH, with support from the Global Fund), ensuring NSU districts can access a reliable supply and longer-term commodity security, and
- providing evidence as well as strategic support to the Zambian MOH to transition pre-referral RAS to scale across Zambia.

The main point of reference for this project's measurement of achievements is its Results-based Management & Accountability Framework (RMAF) summarised in Table 2 below:

Table 2: MAM@Scale Project Targets

Indicator	Indicator Categories	Project Targets			
		Female	Male	Other	Total
# of <u>Lives saved</u> in target communities (in low- and middle-income countries), disaggregated by Age and Sex	New-borns under 1 month				
	Children (1 month - <2 years)	76	76		152
	Children (2 - 4 years)	146	147		293
	Children (5 - 9 years)	95	96		191
# of <u>beneficiaries using innovative products or services to improve their health</u> (disaggregated by sex and age)	New-borns under 1 month				
	Children (1 month - <2 years)	1016	1016		2032
	Children (2 - 4 years)	1948	1947		3895
	Children (5 - 9 years)	1270	1270		2540

Table 3 below shows the list of main indicators for the project. A baseline study was conducted at the beginning of the project in the demonstration districts only. The initial monitoring plan did not include a midline survey since the project was scheduled to end in May 2020. Instead, an endline was supposed to

be conducted at this stage. The reduction in the scale of operation due to COVID-19 necessitated a no-cost extension of project activities up to the end of November 2020 and the third phase of the project (TTS3) will commence soon after the end of the no-cost extension (i.e. December 2020). Considering these factors, a midline review was conducted rather than an endline. An endline study will be conducted at the end of TTS3.

Table 3: MAM@Scale Project Indicators

Indicator	Project Target	Planned Data Source(s)
# lives saved among children aged 6 months to 6 years old	636	HMIS, Outpatient Registers at health facilities
# RAS beneficiaries (children aged 6 months to 6 years)	7,621	Community Monitoring System (CMS) Data
# intervention communities using innovative product	120	Community Monitoring System (CMS) data
# (%) HWs trained in SM case management who manage cases	80	Health facility staff records
# (%) CHVs trained in SM case management who manage cases	1,440	Baseline and midline Surveys
# HWs trained in SM case management	100	Community Monitoring System (CMS) data
# CHVs trained in RAS administration and referral	2,000	Community Monitoring System (CMS) data
# (%) HWs confident to deal with SM cases	80	Baseline and midline Surveys
# (%) CHVs confident to deal with SM in children	1,600	Baseline and midline Surveys
# full-time jobs created by project in Zambia	5	Community Monitoring System (CMS)
# part-time jobs created by project in Zambia	4	Community Monitoring System (CMS)
# outreach or awareness activities conducted	1	Community Monitoring System (CMS)
# beneficiaries reached via outreach or awareness (children 6 months - 6 yrs.)	39,500	Community Monitoring System (CMS)
# community members reached via outreach or awareness activities	115,476	Community Monitoring System (CMS)
Influence / contribution to a change in policy, procedure, or legislation	Yes	Design Mission, Baseline, midline and CMS

Data for indicators in the Gender Strategy was also collected. The indicators for the Gender Strategy are outlined below (Table 4)

Table 4: Indicators for Gender Priorities

Priority	Indicators	Target	How measured
1	# (%) female CHVs	50%	CVH training report
	# (%) female ETS riders	15%	ETS training report

2	# (%) female CHVs with improved severe malaria knowledge	80%	Midline survey
	# (%) female CHVs with confidence to administer RAS	80%	Midline survey
	# (%) female CHVs reporting that they have a stronger voice at community level	70%	Midline survey Qualitative gender empowerment outcomes study
	# (%) of female community members indicating that they have improved scope for decision-making within the households	70%	Qualitative gender empowerment outcomes study/ Midline survey
2	Gender empowerment outcomes study produced	By end of Q4 Y2	Report
	Endline survey incorporates additional gender indicators	By end of Q4 Y2	Midline survey report
3	National i-CCM training manual revised to incorporate MAM@Scale training approach (which includes gender-smart strategies)	By end of Q4 Y2	Review of National i-CCM Training Manual / Approach (discussions with government stakeholders)

1.4 About the midline review

The midline survey was carried out in project areas to assess the possible change that can be attributed to the project particularly with regards to management of cases of severe malaria. Data was collected from the demonstration project districts namely Chitambo and Serenje, and national scale up districts of Chama, Manyinga and Vubwi. The midline survey was conducted in June and July 2020. The main objective of conducting the midline review was to gauge progress to date of the MAM@scale activities. Specifically, the midline review sought to determine:

- i. The availability of trained personnel and malaria drugs at participating HFs in the five districts,
- ii. Changes in knowledge levels on severe malaria and malaria case management by community health workers,
- iii. Changes in social inclusion of disadvantaged females and their children,
- iv. The impact of COVID-19 on the provision of services, and
- v. The contribution to reduction in mortality due to severe malaria in children

2 Review Approach and Methodology

2.1 Approach

2.1.1 Data collection methodologies and sampling

Primary and secondary data collection methods were used to gather data for the midline review. In order to triangulate findings, data was collected using complementary methodologies. Primary data was

collected from HFs and CHVs including ETS riders. It is worth noting that there are no bicycle ambulances in Vubwi and Manyinga; and four (4) bicycle ambulances (BAs) in Chama¹⁶. The number in Chama was too low to be considered, hence only ETS riders from Serenje and Chitambo participated in the survey. Secondary data was collected from the review of HMIS data, project reports and minutes, Community Monitoring System (CMS) reports, data from DHMTs and other relevant national reports. Vubwi started reporting CMS data in January 2020, Manyinga in December 2019, and Chama in October 2019.

Primary data for the survey was collected using two tools which were adapted from the baseline (see Annex 3):

- a) **A health facility tool** - used to capture information on personnel, malaria case management, and preparedness for severe malaria.
- b) **The CHV tool** – this was a structured questionnaire which was administered to CHVs and ETS riders. The questionnaire captured data pertaining to CHVs and ETS knowledge of severe malaria, confidence to deal with children and malaria case management at community level.
- c) **Observation** – enumerators observed the referral forms used by the CHVs as well as the feedback received from the HF. In addition, they observed COVID-19 IEC materials at the HF.

1.1.1 Survey design

The MaM@Scale midline survey sampling was designed to mirror the baseline survey in Chitambo and Serenje. However, sampling included three additional districts (Vubwi, Manyinga and Chama). Sample sizes for respondents were allocated to facilities in two stages: 1) by first selecting HFs randomly then 2) using proportional population served to allocate numbers of respondents. The catchment population for each facility was used as proportional population.

1.1.2 Sample size determination and achievements

The sample size for the midline survey was statistically calculated to provide a robust sample to measure the indicators. The required sample size for each district was calculated using Cochran’s sample size formula for categorical data. The sample size was based on a 95% level of confidence: and allowable margin of error set at 0.05. Other parameters were standard (variance is maximized at P=0.5; non-response is 1%; the design effect is 2 to counter bias from clustering by HFs). The sample size determined using the Cochran formula was 776 CHVs. The distribution of the sample size within Chitambo and Serenje remained the same as at baseline (i.e. 213 CHVs in each of the district) while for the remaining three district probability proportion to size (PPS) was applied to distribute the sample (Table 5).

Table 5: Showing the distributed sample sizes among the five districts

District	Population coverage	Weight	Target	Actual	
				N	%
Serenje	108,181	-	213	317	149%
Chitambo	51,917	-	213	215	101%

¹⁶ The ETS will be scaled in Chama, with training and BA distribution planned for September 2020

Manyinga	59	0.4758065	167	66	40%
Chama	30	0.2419355	85	56	67%
Vubwi	35	0.2822581	99	66	67%
Total	284,098	1	776	720	93%

Of the desired 776 CHVs during the review the survey managed to achieve 720. This was 92.8% coverage. All targets in the demonstration districts was achieved while in the NSU districts the main challenge was that the target exceeded the total number of CHVs trained. The main reason for not achieving the target was that some community members were skeptical about coming to the health facilities because of COVID-19 and also their telephone numbers were not reachable. However, this does not affect the reliability of the results.

Table 6: Number of interviewed CHVs by type and by district		Baseline		Midline	
		CHVs at baseline	RAS trained CHVs	Community mobilisers	Total
District Type					
Demonstration districts		427	478	54	532
NSU districts		0	188	0	188
Total		427	666	54	720
District					
CHAMA		0	56	0	56
CHITAMBO		214	214	1	215
MANYINGA		0	66	0	66
SERENJE		213	264	53	317
VUBWI		0	66	0	66
Total		427	666	54	720

A total of 40 HF's was targeted in the five participating districts. The sample was distributed among the sites relative to the population coverage. All HF's visited during the baseline survey (i.e. in Serenje and Chitambo) were visited during the midline together with the HF's in the NSU districts (i.e. Chama, Manyinga and Vubwi). Sample sizes were allocated to HF's to strike a balance between old and new sites and the intensity (high/medium or low intensity). A total of 15 HF's were to be visited in Serenje, 10 in Chitambo, and five (5) in each of the other districts (i.e. Vubwi, Manyinga and Chama). Table 7 below shows the number of HF's that were to be visited.

	Site	District	Serenje	Chitambo	Vubwi	Manyinga	Chama	Total
Population	Old	High or Medium	9	-	-	-	-	9
		Low Intensity	-	-	-	-	-	-
	New	High or Medium	7	13	-	-	-	20
		Low Intensity	10	1	12	11	5	39
	Total		26	14	12	11	5	68

Sample	Old	High or Medium	5	-	-	-	-	5
		Low Intensity	-	-	-	-	-	0
	New	High or Medium	4	9	-	-	-	13
		Low Intensity	6	1	5	5	5	22
Total (Targeted)			15	10	5	5	5	40
Reach (Actual)			16	10	12	5	5	48

Table 7: Distribution of Health Facilities

A total of 48 HFs were surveyed during the midline survey (see the list Table A1 in the annexes). More HFs were visited at midline as compared to baseline mainly because of the additional three National Scale Up districts (NSU) added at midline. In addition, more HFs were visited than sampled because of the need to reach the targeted number of CHVs. The main respondent at the health facility was the most senior staff member at the health facility. Table 8 below shows the surveyed HFs by facility type.

Table 8: Survey coverage by facility type

Health facility type	Number of Facilities	
	Baseline	Midline
Hospital	1	2
Rural Health centre	12	23
Rural Health post	4	23
Total	17	48

2.2 Methodology

2.2.1 Field data collection



Midline data collection was carried out by external enumerators contracted by Development Data. The data collection exercise commenced on the 29th of June and ended on the 9th of July 2020. Eighteen (18) data collectors were deployed for the data collection exercise and were supervised by a team of five survey team leaders. Survey data collectors utilised hired vehicles to access HFs. To comply with COVID-19 measures of limiting the number of people in each vehicle, the team leaders were responsible for driving the vehicles. Furthermore, each vehicle carried

between three to four people.

Table 9 : Data collection challenges and solutions

Challenge	Solution
Conducting the survey during the COVID19	We reduced the size of data collection teams to three or four members, and when conducting interviews at HFs enumerators maintained social distancing and they were equipped with face masks and hand sanitisers.
The calculated sample sizes for the national scale districts were more than the number of trained CHVs who were in those districts.	Teams in the NSU districts did a census of all the trained CHVs and the balance was spread among the demonstration districts. This did not affect the study because the domain was not districts but rather the entire project area.
Some CHVs did not show up at their designated HFs for interviews. It was reported by some HF staff that some community members were still skeptical about public gatherings because of COVID-19.	Teams had to follow some CHVs to their households. In some cases roads were in a poor condition and hence teams had to leave vehicles and walk. Telephone interviews were also conducted for those CHVs that were not available when team visited their homes. These comprised 3.3% of all the interviews conducted with CHVs.
Poor record keeping in HFs e.g. Malaria Cases data	Team leaders had to spend more time at some facilities to retrieve the records. However, the HF staff were willing to assist.
Vehicle breakdown 	The teams managed to get assistance from the vehicle hire as well as other team members. For instance, the Chama team managed to get a spare wheel from the Chitambo team after their spare wheel got a puncture. The Chama team had used their spare wheel when their tyre burst. The team was back on the road after they got the spare wheel from the Chitambo team.

Data was collected using Android tablets and Computer Aided Personal Interview (CAPI) software. All interviews took place at each of the 48 sampled HFs where CHVs were mobilised. Interview respondents were mobilised in advance to improve the response rate and subsequent achievement of targets and

these were interviewed at their respective HFs. Where the targeted numbers were not met, the research teams visited CHVs at their homes. If they were not available at their homes, they were interviewed through telephone calls. The telephone numbers were provided by the CFs. No remuneration was given to those taking part in the midline survey. However, every respondent was given a mask for protection against COVID-19.

2.2.2 Data Quality and Data analysis

- **Data quality**

A data collection supervision team from Development Data was put in place to monitor the data collection exercise. Quality checks during data collection were conducted and any inconsistencies and errors noted were communicated immediately to the M& E Advisor.

To guarantee that data of good quality is collected during this survey the following steps were taken:

- Validation rules incorporated into the survey tools: Quality checks were incorporated in the survey data collection tools. The Data manager from Development Data closely monitored the quality of the data uploaded on to the server by enumerators and gave feedback to the data collectors.
- Survey support and supervision: Survey spot-checks were conducted by team leaders in all districts to see whether enumerators were visiting the HFs and carrying out the survey appropriately.
- Near real time data collection monitoring: Daily updates of survey coverage and the quality of the data submitted to the Survey server were provided by the Data Manager.
- Data cleaning and verification: Data cleaning and verification informed by the near real time monitoring was conducted.

- **Data analysis**

Data submitted to the survey server was analysed using SPSS version 25 software and QGIS 3.12.2 (for spatial data analysis). All statistical significance was assessed at $p < 0.05$ (2 sided)

For noting: In this report, some percentages are presented in the format $x\%$ (n), (where n is the absolute value) and $X\%$ (N), (where N refers to the total number of HFs that constituted the denominator for the calculation). This denominator (N) may vary from one analysis to the next due to missing values on the variable under consideration. In all instances, the denominator will be all facilities that provided a response to the variable under consideration

2.2.3 Limitations

There were no major limitations for the study, only that we failed to meet the desired target in the NSU districts. This did not affect the reliability of the results as the results still give us more than 94% confidence of the results. The COVID-19 restrictions were catered for during the planning stages and observed during implementation.

3 Midline Review Findings

The findings presented in this section are organised according to the objectives of the review and use data from both primary and secondary data sources as discussed in the methodology section. Some of the results tables and figures are available in the annexes section.

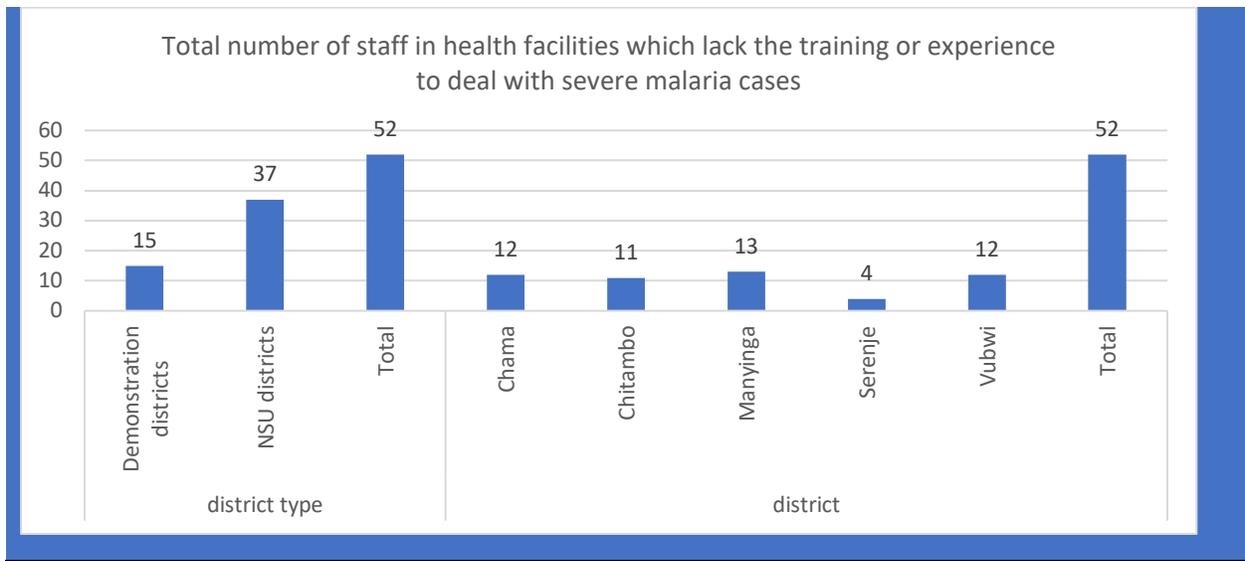
3.1 Objective 1: To determine the availability of trained personnel and malaria drugs at health institutions

3.1.1 Availability of trained staff on Injectable Artesunate

The review sought to determine the availability of personnel trained on Inj AS at health facility level. Results show that 89.6% of the HFs at midline compared to 88.2% at baseline had at least one health worker trained on Inj AS. Disaggregation of data by HFs in demonstration districts only, shows that a greater proportion had at least one health worker trained on Inj AS at baseline compared to midline (88.2% vs 80.8%), though the variation was not statistically significant ($p>0.05$). Further analysis of data at midline comparing NSU and demonstration districts reveals that while all HFs (100%, $n=22$) in NSU districts have at least one health worker trained on Injectable AS, 80.8% ($n=21$) in demonstration districts reported the same. This was noted to be statistically significant ($P<0.03$). It is worth noting that in some HFs in the demonstration districts, the team of interviewers did meet new staff members. Hence the lower percentage in the demonstration district could be due to staff rotations that happen occasionally in the health sector. The staff available at HFs by district are also presented in Table A2 in the annexes.

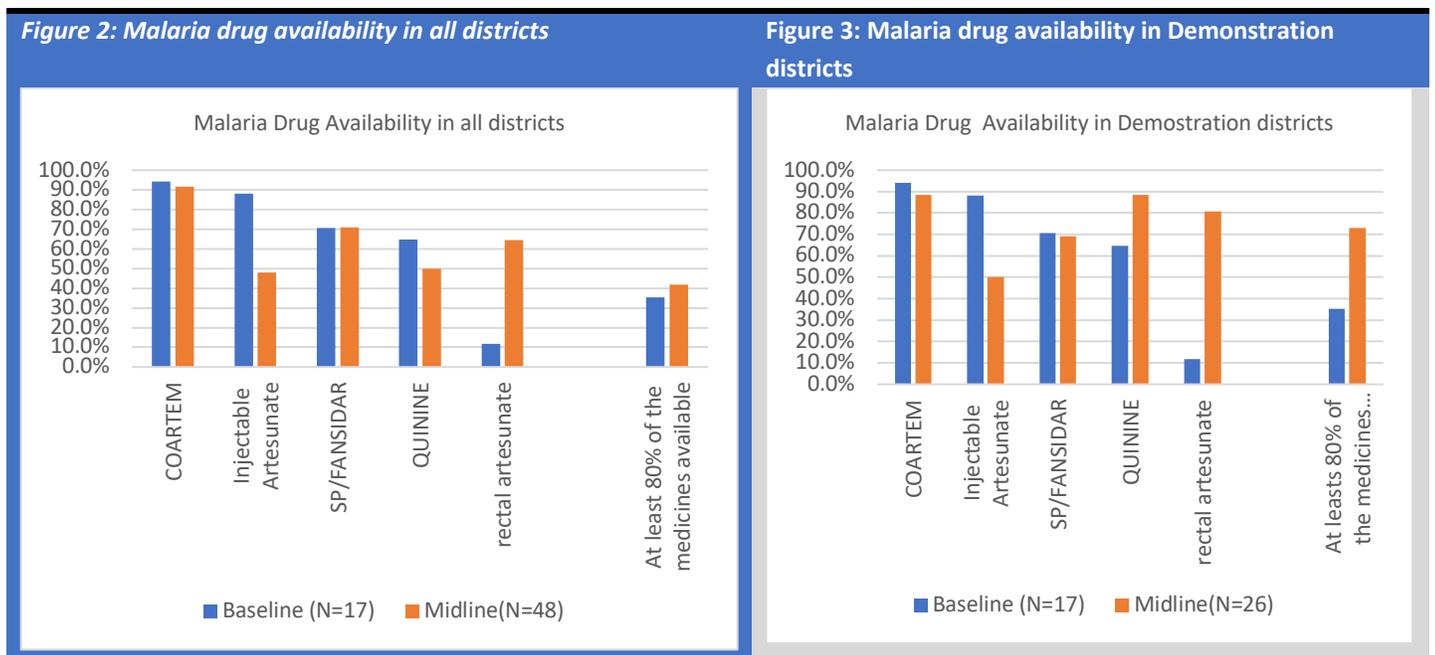
Nurse in-charges at visited HFs were asked about the number of staff at their HF who lack the training or experience to deal with severe malaria. Figure 1 below shows the total number across the project districts. There were more HWs (37) in NSU districts who lack training/experience in dealing with severe malaria than in demonstration districts (15). The results therefore show that whilst all HFs in NSU districts have at least one staff member trained on Inj AS, there are staff members who still require training or have no experience in terms of managing cases of severe malaria.

Figure 1: Number of staff lacking training or experience



3.1.2 Severe malaria drug availability at health facilities

Data was collected on malaria drug availability in HFs in the same manner as it was collected at baseline. The availability of the following medicines was checked: SP/FANSIDAR, QUININE (Oral/ injectables), Inj AS and COARTEM¹⁷.



Source: Health facility survey

¹⁷ Artemether-Lumefantrine (or any other ACT such as ASAQ, DHA-PPQ)

Of the five malaria drugs assessed, more HFs at midline than baseline (41.7% vs 35.5%) of the HFs included in the survey had at least 80 percent (at least four of the medicines) available on the day of the survey. However, the variation was not statistically different, $p>0.05$. Analysis of data by the HFs in the demonstration districts, which was the sample for the baseline, shows that significantly more HFs at midline had at least 80% of the assessed medicines in comparison to the baseline (73.1%vs 35.3%: $p<0.01$).

At midline, the most available malaria drug was Coartem, which was also the most available at baseline. The least available drug at midline was Inj AS. The results also show that, the availability of RAS has greatly improved from baseline to midline (Refer to Figure 2 and 3 above). This trend was observed in the demonstration districts since these are the only districts where the baseline survey was conducted. Data from project reports show that stocks for Inj AS were indeed low at the time of the midline survey. However, the drug had been available for the greater part of the reporting period. The low stock level can be attributed to challenges with procurement and distribution owing to the COVID-19 pandemic. However, concerns about the availability of the drug have been raised on other platforms. The survey further checked on the stock status of the malaria drugs assessed, and the results are presented in Table A3 in the annexes.

The health facility staff also indicated that there were no adverse effects reported from malaria treatment affecting children between the ages of 6 months and 5 years at both baseline and midline.

3.2 Objective 2: Changes in knowledge levels on severe malaria and case management by community health workers

3.2.1 Community Health Workers Knowledge on Severe Malaria

At midline, the survey covered a sample of 854 respondents comprising of CHVs and ETS riders. As indicated earlier (section 1.1.2), the CHVs included those trained in the administration of RAS and severe malaria community mobilisers. It is important to note that cascading training only took place in demonstration districts and not in NSU districts. Therefore, a total of 134 CHVs who were not trained under the project but were interviewed in NSU districts were excluded in the analysis. Such CHVs had been given some informal training on severe malaria by CHVs who had been directly trained by the project, but were not counted as having been formally trained by MAM@Scale. The distribution of sample sizes is given in Table 6 in section 1.1.2. The characteristics of the CHVs are given in the annexes.

CHVs were asked if they knew about the malaria danger signs in children. Comparing the responses from CHVs at baseline and midline, the results show an improvement from baseline (71.1%, N=426) to midline (99.7%, N=719) in the proportion of CHVs who mentioned that they knew about the malaria danger signs in children. The change was statistically significant ($p<0.05$). Analysis by gender did not show much variation during midline. The proportion of female CHVs who knew the danger signs of severe malaria in children significantly increased ($p<0.05$) from baseline (72.6%) to 99.7% during midline. Figure 4 show the results.

Figure 4: CHV Knowledge of severe malaria by gender

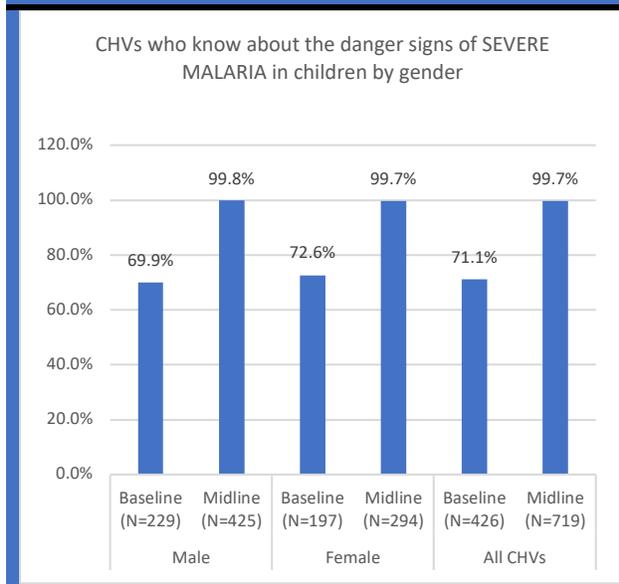
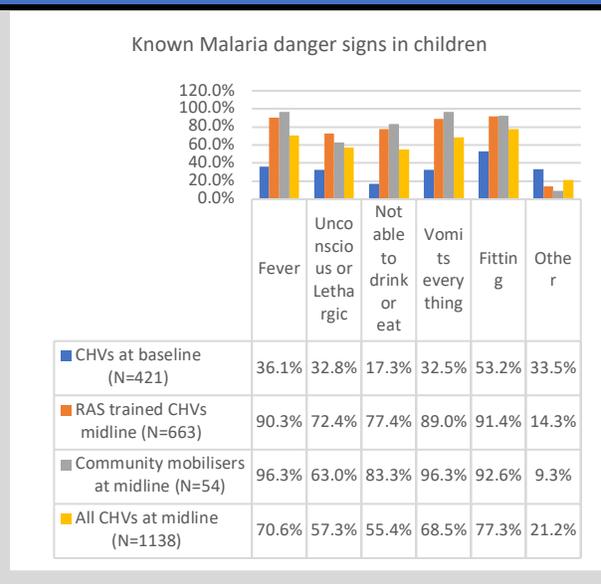
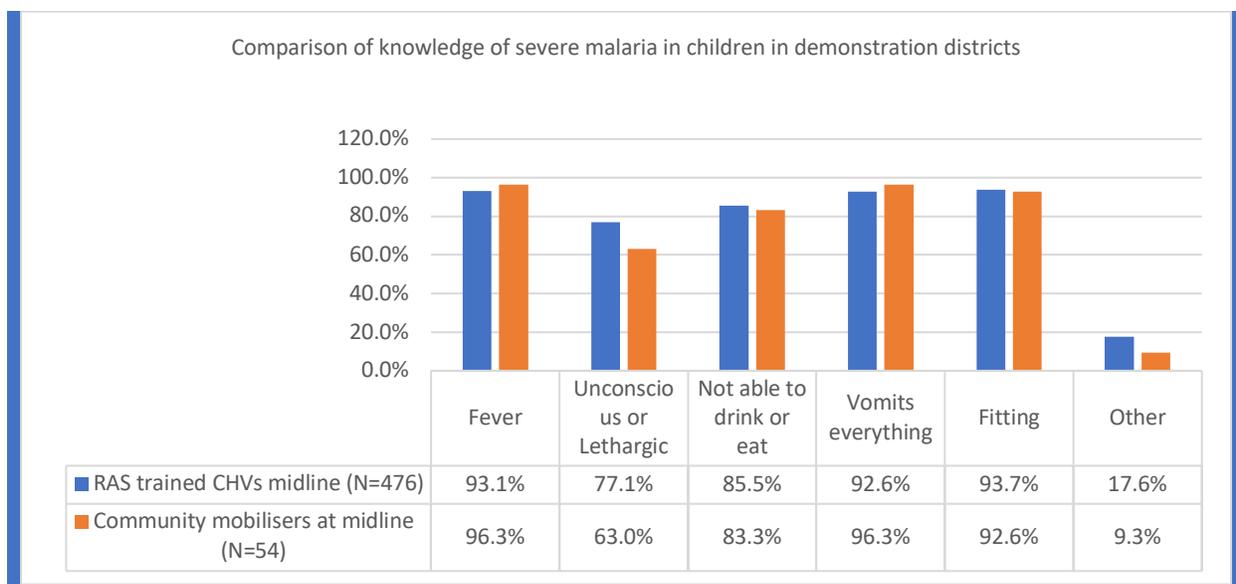


Figure 5: Knowledge of Malaria danger signs in children



CHVs were further asked about the type of danger signs they knew. Overall, the most mentioned danger sign was fitting (77.3%), followed by fever (70.6%), and vomiting everything (68.5%). The midline findings of the danger signs followed a similar trend as baseline although there were notable improvements. See figure 5 above for detailed results. Figure 6 below shows a comparison on malaria danger signs knowledge levels between RAS trained CHVs and RAS community mobilisers within demonstration districts. The results did not show much variation between the two groups. Fever was mostly mentioned by community mobilisers (96.3%) than RAS trained CHVs (93.1%). This shows that the cascade training is effective. It also shows that the innovative methodology that is used to train CHVs in the severe malaria danger signs is very effective.

Figure 6: Comparison of knowledge of severe malaria in children in demonstration districts



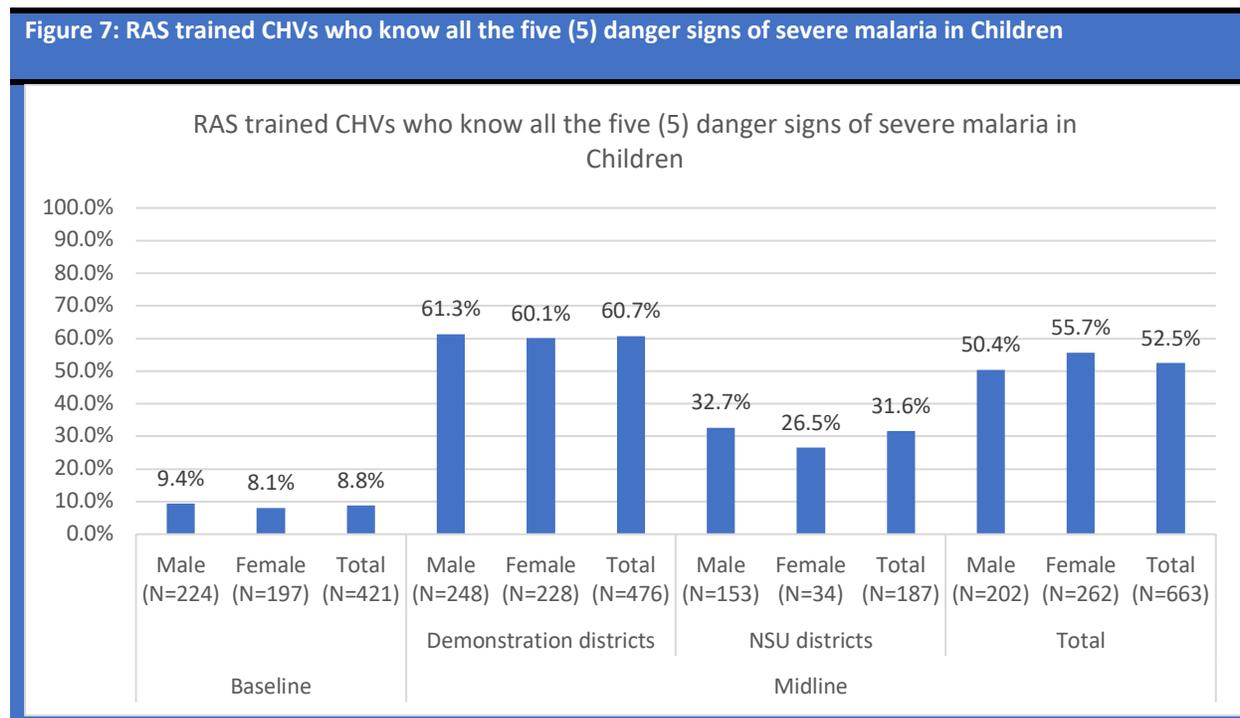
Analysis by district show some considerable increases in the knowledge of malaria danger signs in children in the demonstration districts. Knowledge of fitting as a malaria danger sign in children increased from 47.9% at baseline to 95.5% at midline in Serenje. Knowledge levels were very high in Serenje at baseline due to the presence of the MAM project. In Chitambo it changed from 58.6% at baseline to 91.5% at midline. Table 10 below shows the results in detail.

Table 10: Knowledge of malaria danger signs in children by district

	CHVs at baseline			RAS Trained CHVs at midline			
	SERENJE	CHITAMBO	SERENJE	CHITAMBO	CHAMA	MANYINGA	VUBWI
N	213	213	264	213	56	66	66
Fever	38.4%	33.8%	98.1%	86.8%	67.9%	84.6%	95.5%
Unconscious or Lethargic	28.4%	37.1%	77.3%	76.9%	51.8%	76.9%	51.5%
Not able to drink or eat	16.1%	18.6%	88.3%	82.1%	60.7%	64.6%	45.5%
Vomits everything	35.5%	29.5%	96.6%	87.7%	80.4%	84.6%	74.2%
Fitting	47.9%	58.6%	95.5%	91.5%	98.2%	69.2%	90.9%
Other	35.1%	31.9%	15.9%	19.8%	3.6%	9.2%	4.5%
Proportion of CHVs who know all the five (5) danger signs	4.7%	12.9%	65.2%	55.2%	30.4%	36.9%	27.3%

An analysis of the proportion of CHVs who knew all the (5) danger signs of malaria in children was carried out as shown on table 10 above. Overall, (52.5%, N=663) (60.7% demonstration districts, and 31.6% in

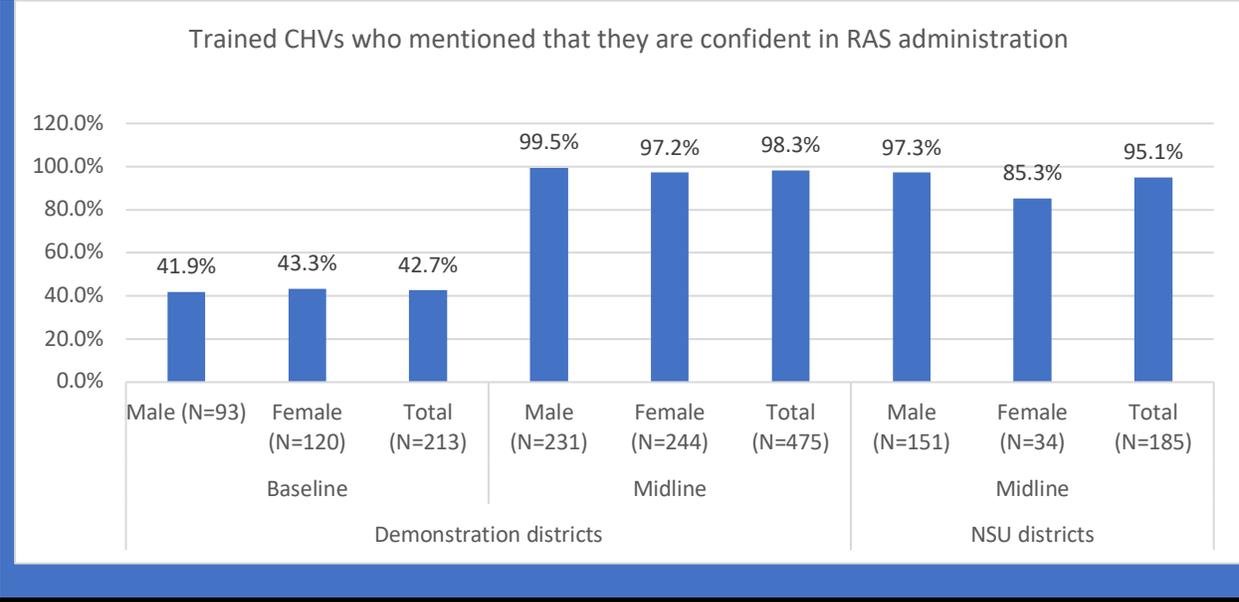
NSU districts) of the CHVs mentioned all the five (5) danger signs of severe malaria in children (fever, unconscious or lethargic, not able to drink or eat, vomits everything and fitting). Analysis by survey type shows a statistically significant ($p < 0.05$) improvement from baseline (8.8%, N=421) to midline (60.7%, N=476) in the proportion of CHVs who knew all the five (5) malaria danger signs in children. Figure 7 below shows the results in detail.



3.2.2 Community health workers' confidence to deal with children

At baseline and midline, the RAS trained CHVs were asked if they have ever heard about RAS. The proportion of this cadre who have ever heard about RAS significantly ($p < 0.05$) improved from baseline (10.8%, N=213) to (98.5%, N=428) at midline. The RAS trained CHVs were asked if they are confident to administer RAS, 98.3% (N=428) of the CHVs at midline mentioned that they are confident enough to administer RAS. This proportion is significantly higher than the baseline proportion (42.7%). Analysis by gender did not show much variation. However, more CHVs in demonstration districts (98.3%) than in NSU district (95.1%) are confident in RAS administration. Figure 8 below shows the detailed results.

Figure 8: Confident CHVs in RAS administration



When CHVs were asked if they face any challenges in administering RAS, the results show a significant decrease in the proportion of CHVs who are having challenges in the demonstration district from baseline (34.9%) to midline (14.7%). The proportion of CHVs who are having challenges in administering RAS in the NSU districts is lower (10.3%) as compared to the demonstration districts at midline (16.4%). Analysis by gender shows a statistically significant relationship ($p < 0.05$) between gender and the CHVs facing challenge in RAS administration during midline. More males (19.9%, $N = 226$) than females (13.1%, $N = 237$) faced challenges in administering RAS in the demonstration districts. Table 11 below shows the results.

Table 11: CHVs having challenges in administering RAS

CHVs having challenges in administering RAS							
District Type	District	Male		Female		All CHVs	
		Baseline	Midline	Baseline	Midline	Baseline	Midline
Demonstration districts	Demonstration districts	33.0%	19.9%	36.4%	13.1%	34.9%	16.4%
	NSU districts	-	10.4%	-	9.7%	-	10.3%
	Total	33.0%	16.2%	36.4%	12.7%	34.9%	14.7%
NSU districts	SERENJE	38.6%	18.5%	44.6%	12.5%	42.0%	15.2%
	CHITAMBO	28.0%	21.5%	29.2%	14.0%	28.7%	18.0%
	CHAMA	-	9.6%	-	0.0%	-	9.4%
	MANYINGA	-	12.5%	-	11.1%	-	12.3%
	VUBWI	-	8.3%	-	9.5%	-	8.8%
	Total	33.0%	16.2%	36.4%	12.7%	34.9%	14.7%

CHVs were asked about the challenges they face when administering RAS, the responses were similar to those obtained at baseline. The main challenges mentioned were as follows:

- Parents refusal – some of the parents do not allow CHVs to administer RAS

- Child defecating in the process - sometimes after administering RAS a child may defecate before the capsule dissolves
- Shortage of materials to use e.g. soap, dishes and gloves
- Shortage of RAS and RDT – sometimes CHVs may not have these in stock.

Further analysis of these qualitative responses shows that more males encountered the challenge where parents do not allow them to administer RAS. This is an issue that needs following up to determine in detail why this is the case. All RAS-trained CHVs are trained to support a child’s carer to administer RAS if they encounter a refusal. Future coaching and mentoring support inputs will need to reiterate that there is an alternative way to administer RAS if carers feel uncomfortable with a CHV administering the pre-referral intervention. What is essential to note is that the challenges are not emanating from lack of skill or knowledge but are external to CHVs.

3.2.3 Case management of severe malaria by Community Health Workers

CHVs were asked if they had ever managed a case of severe malaria. The proportion of CHVs in the demonstration districts that are managing cases of severe malaria significantly improved by 13.9% from (79.2%, N=427) at baseline to (93.1%, N=452) at midline. At midline in the NSU districts, 89.2% of the CHVs mentioned that they have managed cases of severe malaria among children, this is slightly lower than the demonstration districts. A considerably larger proportion of CHVs who have managed a case of a child with malaria was found in Serenje with an improvement of 23.3 percentage points (70.9% to 94.2%) as compared to Chitambo with an improvement of 11.6% (87.4% to 99%). CHVs were further asked regarding the last time they managed a case of malaria in children (see Table 12 below). Most of the CHVs mentioned that they have managed a case of malaria in the year 2020. The results generally show that CHVs are active managing malaria cases in both the demonstration and NSU districts and this is essential for the success of the project.

Table 12: Case management of severe malaria

	Have you ever managed a case of a child with suspected malaria?				If yes, when was the last time you managed the malaria case in a child					
	N	Yes	No	Total	N	2020	2019	2018	Total	
Demonstration districts	Baseline	427	79.2%	20.8%	100%	336	67.6%	29.5%	3.0%	100%
	Midline	452	93.1%	6.9%	100%	421	93.8%	5.9%	0.2%	100%
NSU districts	Midline	166	89.2%	10.8%	100%	148	92.6%	7.4%	0.0%	100%
CHVs at baseline	SERENJE	213	70.9%	29.1%	100%	149	66.4%	31.5%	2.0%	100%
	CHITAMBO	214	87.4%	12.6%	100%	187	68.4%	27.8%	3.7%	100%
RAS trained CHVs midline	SERENJE	206	94.2%	5.8%	100%	194	93.3%	6.2%	0.5%	100%
	CHITAMBO	199	99.0%	1.0%	100%	197	93.4%	6.6%	0.0%	100%
	CHAMA	53	83.0%	17.0%	100%	44	86.4%	13.6%	0.0%	100%
	MANYINGA	65	86.2%	13.8%	100%	56	91.1%	8.9%	0.0%	100%
	VUBWI	48	100.0%	0.0%	100%	48	100.0%	0.0%	0.0%	100%
	Total	571	94.4%	5.6%	100%	539	93.1%	6.7%	0.2%	100%
	SERENJE	46	65.2%	34.8%	100%	30	100.0%	0.0%	0.0%	100%

Community mobilisers at midline	CHITAMBO	1	0.0%	100%	100%	0	0.0%	0.0%	0.0%	0%
	Total	47	63.8%	36.2%	100%	30	100.0%	0.0%	0.0%	100%

3.2.4 Referral cases of severe malaria

Both groups of CHVs (RAS trained and community mobilisers) were also asked if they had ever referred any children with simple malaria or severe malaria to a health facility. The proportion of CHVs in demonstration districts who have referred children significantly improved by 34.8 percentage points from (56.3%, N=213) at baseline to (91.1%, N=474) at midline. In addition, at midline, more referrals by CHVs were made in the demonstration districts than the NSU districts (91.1% vs 83.7%). The increase in referrals was confirmed by surveyed HFs who indicated that cases of severe malaria which were referred from the community by CHVs increased by 86.4 % from baseline (191 cases in 2018) to (1400 cases in 2019) at midline. This is a significant increase registered during the period. This can be attributed to the solid foundation that was established by the MAM project which was implemented in the district prior to project implementation. The increase in referrals is a positive move towards reducing mortality among children in the project areas due to severe malaria.

CMS data shows that 99.14% of RAS beneficiaries were given referral forms by CHVs during the period February 2019 to May 2020.¹⁸ When asked about the type of written material or form they use to refer patients with malaria to the health facility, most of the CHVs (82.1%, N= 430) mentioned they use of pages from their notebooks. This is different from the baseline situation in the demonstration districts where most of the CHVs used nothing (40%, N=120). The scenario is a bit different in the NSU districts where half of the respondents mentioned that they use referral forms when referring patients (52.0%, N = 152). See Figure 9 below

¹⁸ Data Summary and Analysis: February 2019 – end May 2020.

Figure 9: Type of written material or form used to refer clients with malaria to the health facility

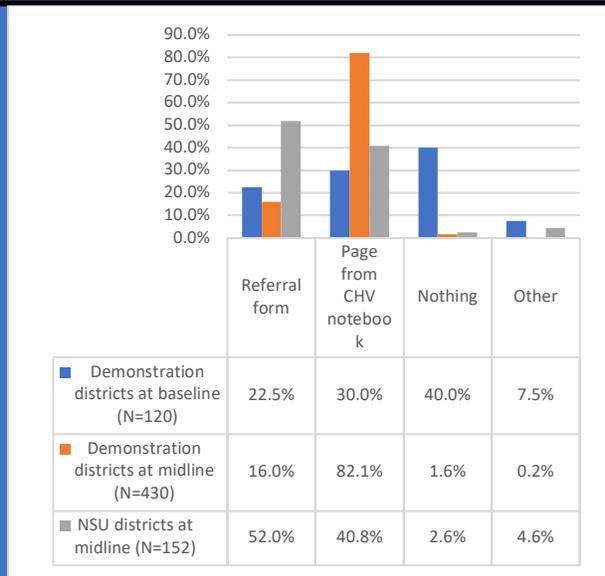


Figure 10: Type of written material or form obtained from the health facility after referring clients with malaria to the health facility

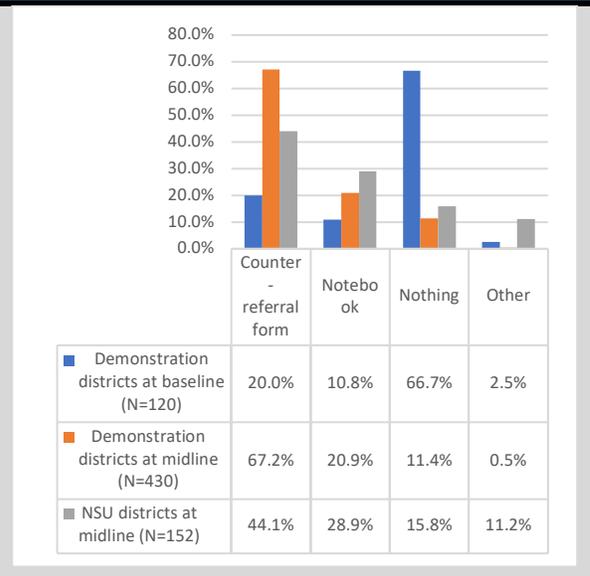
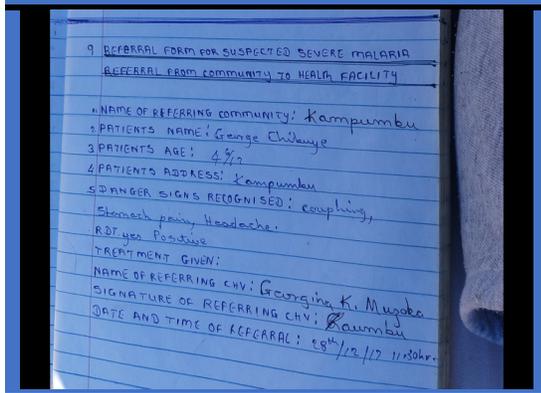


Figure 11: Referral form used by a CHV in Kampumpu community [district?]



Furthermore, Figure 10 above also shows the results on type of written material CHVs receive from the health facility after referring a patient. The results show an improvement from baseline to midline. Most of the CHVs at baseline mentioned that they did not receive a counter-referral form (66.7%) from the HFs which is different from the CHVs at midline where most of them (67.2%) mentioned that they get a counter referral form. In addition, 44.1% of the CHVs in the NSU districts mentioned that they get a counter referral form the health facility. Analysis by district shows that the proportion of CHVs who have ever referred children with simple malaria or severe malaria to a health facility has

improved more in Chitambo by 45.8% (from 52.2% to 98.0%) than in Serenje where it improved by 24.9% from 61.2% at baseline to 86.1% and midline. Whilst the use of a page from a CHV notebook when referring clients was found to be a prominent method, it improved more in Serenje (by 55.6%, from 35% to 90.6%). In comparison, in Chitambo the change was 46.9% (from 25.0% to 71.9%). At HFs, counter referral forms are now widely used in Chitambo – more so than in Serenje. This is shown by an improved 66.2% points (20.0% to 86.2%) in Chitambo compared to 31.3% points (20.0% to 51.3%) in Serenje. For the NSU districts, CHVs are more likely to use referral forms when referring clients in Chama (73.3%) and Manyinga (60.0%). In Vubwi, CHVs are more likely 57.9%) to use pages from their notebooks. The use of

counter-referral forms at HFs has improved by 61.1% with 805 cases issued with counter referral form during the baseline which increased to 2072 at midline. Table 13 below presents the results in detail.

Table 13: Material or forms used to refer clients to the health facilities

		SERENJE			CHITAMBO			CHAMA	MANYINGA	VUBWI
		Baseline	Midline	Change	Baseline	Midline	Change	Midline	Midline	Midline
Written material or form used to refer clients	Referral form	20.0%	7.7%	-12.3%	25.0%	26.0%	1.0%	73.3%	60.0%	28.1%
	Page from CHV notebook	35.0%	90.6%	55.6%	25.0%	71.9%	46.9%	24.4%	36.0%	57.9%
	Nothing	36.7%	1.3%	-35.4%	43.3%	2.0%	-41.3%	2.2%	4.0%	1.8%
	Other	8.3%	0.4%	-7.9%	6.7%	0.0%	-6.7%	0.0%	0.0%	12.3%
	Total	100%	100%		100%	100%		100%	100%	100%
Written material or form obtained from the health facility	Counter-referral form	20.0%	51.3%	31.3%	20.0%	86.2%	66.2%	62.2%	44.0%	29.8%
	Notebook	13.3%	29.5%	16.2%	8.3%	10.7%	2.4%	2.2%	36.0%	43.9%
	Nothing	65.0%	18.8%	-46.2%	68.3%	2.6%	-65.7%	11.1%	16.0%	19.3%
	Other	1.7%	0.4%	-1.3%	3.3%	0.5%	-2.8%	24.4%	4.0%	7.0%
	Total	100%	100%		100%	100%		100%	100%	100%

A total of 1,348 cases (1240 cases in demonstration districts vs 108 cases in NSU districts) were give ACT at discharge. Table 14 below shows these results.

Table 14: Perspective of health facilities on referrals

Survey	Period	Severe malaria cases referred from the community by CHVs			Referrals that came with a referral form that was completed			Cases provided with a completed counter-referral form			Number of severe malaria cases given ACT at discharge			Number of severe malaria cases referred by a CHV had been administered RAS.		
		Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline
Baseline	Jan 2018	46			278			278								
	Feb 2018	36			184			184								
	Mar 2018	30			148			148								
	Apr 2018	17			36			36								
	May 2018	21			34			34								
	Jun 2018	12			32			32								
	Jul 2018	17			48			48								
	Aug 2018	4			8			8								
	Sep 2018	2			12			12								

Midline	Oct 2018	4		13		13										
	Nov 2018	1		5		5										
	Dec 2018	1		7		7										
	Total	191		805		805										
	Jan 2019	26	0	26	122	0	122	102	0	102	33	13	46	30	0	30
	Feb 2019	53	0	53	120	0	120	98	0	98	59	0	59	66	0	66
	Mar 2019	187	0	187	347	0	347	282	0	282	172	13	185	204	0	204
	Apr 2019	358	0	358	525	0	525	442	0	442	297	0	297	355	0	355
	May 2019	235	0	235	385	0	385	342	0	342	202	0	202	234	0	234
	Jun 2019	128	0	128	231	0	231	202	0	202	105	0	105	123	0	123
	Jul 2019	56	0	56	101	0	101	86	0	86	41	19	60	56	0	56
	Aug 2019	46	0	46	57	0	57	52	9	61	36	15	51	40	0	40
	Sep 2019	45	10	55	58	13	71	51	8	59	40	18	58	42	8	50
	Oct 2019	61	14	75	80	14	94	73	13	86	57	13	70	50	13	63
	Nov 2019	73	7	80	109	7	116	106	7	113	78	10	88	62	7	69
	Dec 2019	132	7	139	279	9	288	236	7	243	120	7	127	124	7	131
	Total	1400	38	1438	2414	43	2457	2072	44	2116	1240	108	1348	1386	35	1421

3.2.5 Follow-up of severe malaria cases

CHVs were asked if they followed up cases and checked on the health of children with severe malaria after they have returned from the health facility. Most of the CHVs at midline (82.3%, N=413) mentioned that they always follow up severe malaria clients. There is a significant improvement when comparing this to the baseline (66.7%, N=27). The results also show an improvement in the number of times CHVs make follow up visits on their clients from baseline (44% mentioned twice) to midline (58.6% mentioned three times). In Serenje, the proportion of CHVs who make follow up visits three times improved from 20% at baseline to 60.4% at midline. Similarly, in Chitambo CHVs who said that they made three follow up visits improved from 33.3% at baseline to 56.6% at midline. The results are presented in Table 15 below.

Table 15: Follow-up of severe malaria cases

	SERENJE				CHITAMBO				CHAMA		MANYINGA		VUBWI	
	Baseline		Midline		Baseline		Midline		Midline		Midline		Midline	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Do you follow up to check on the health of children with severe malaria after they have returned from the health facility?														
Always	7	58.3%	167	75.2%	11	73.3%	177	90.3%	37	82.2%	30	60.0%	43	84.3%
Sometimes	3	25.0%	55	24.8%	4	26.7%	19	9.7%	8	17.8%	20	40.0%	8	15.7%
Never	2	16.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	12	100%	222	100%	15	100%	196	100%	45	100%	50	100%	51	100%
How many times on average do you check on them?														
Once	3	30.0%	4	1.8%	3	20.0%	2	1.0%	0	0.0%	22	44.0%	2	3.9%
Twice	4	40.0%	44	19.8%	7	46.7%	60	30.6%	17	37.8%	23	46.0%	18	35.3%
Three times	2	20.0%	134	60.4%	5	33.3%	111	56.6%	9	20.0%	5	10.0%	29	56.9%

More than three times	1	10.0%	40	18.0%	0	0.0%	23	11.7%	19	42.2%	0	0.0%	2	3.9%
Total	10	100%	222	100%	15	100%	196	100%	45	100%	50	100%	51	100%

3.2.6 Use of emergency transport system

A total of 53 ETS riders were interviewed during the survey in the demonstration districts. ETS riders were asked about the distance they travel from the central part of their communities and the time they took to get the HFs. Table 16 below shows the results. Overall, in the two demonstration districts combined at midline shows that ETS riders are travelling an average distance of 11.3 km from the central part of their communities to the nearest HFs. This is statistically significant different from the average of 10.5 km which was mentioned by ETS riders at baseline, $p < 0.05$. This increase in average distance travelled could be an indication of a spread in awareness about the projects work, and subsequently riders are receiving requests for ETS from those in communities that are not more centrally located. When the ETS riders were asked about the time taken to reach the facility by a bicycle ambulance, CHVs at midline mentioned an average time of 92.2 minutes which is significantly different from 75.8 minutes mentioned during baseline. This longer average time may not only reflect the longer distances travelled but potentially also the time required to reach not centrally located patients who may also reside along less well travelled and poorer road networks. The results also show that ETS riders in Serenje travel significantly longer distances (12 km) than ETS riders in Chitambo (8 km). More details are presented on Table A 4. CHVs in Serenje are travelling longer distances at midline, although report a similar mean travelling time at midline compared to baseline. This could suggest better handling of BAs on long journeys, and greater familiarity with ETS protocols which allow them to reach HFs more promptly with patients. Additionally, both the distance and time variations between the base and midline may be a reflection of attitudes in the communities and in the usage of the BAs. Perhaps those who were using the BAs 18 months previous to the midline during the baseline are now more knowledgeable about malaria danger signs, the causes and prevention. These pockets of communities might be more equipped for timely and effective severe malaria case management, which in turn would lessen the need for emergency care. Concurrently those in different areas have since learnt about the project, including ETS, and started utilizing the service.

Table 16: Distance (kms) and time taken (minutes) by ETS riders to reach the health facilities

	SERENJE		CHITAMBO		ALL DISTRICTS		
	Baseline	Midline	Baseline	Midline	Baseline	Midline	
Distance In Km from the central part of communities to the health facility?	N	3	35	3	15	6	50
	Mean	7.7	12.7	13.3	8.0	10.5	11.3
	Standard Deviation	3.8	7.3	4.2	4.3	4.7	6.8
Time in minutes taken to reach the health facility when	Mean	78.3	79.6	73.3	121.6	75.8	92.2
	Standard Deviation	45.4	35.0	56.9	80.1	46.1	55.3

carrying a patient by bicycle ambulance? Time in minutes taken to reach the health facility on foot?	Mean	140.0	165.4	146.7	204.3	143.3	177.1
	Standard Deviation	86.6	88.7	73.7	134.2	72.0	104.6

When ETS riders were asked if they think that bicycle ambulances can be used for both maternal and child health emergencies, all the CHVs at midline mentioned that the community is in agreement with that. This is almost similar to what was mentioned at baseline where out the 6 ETS riders interviewed, 5 of them mentioned that the community agrees.

ETS riders were also asked about the challenges they face and the following were the main challenges cited:

- Poor road networks,
- Long distances to the HFs ,
- Lack of lighting materials e.g. torch, to work during the night

These challenges have not deterred the ETS riders from doing their work. The case study below shows the passion that ETS riders have for their work and this has motivated them to continue doing their work even under difficult circumstances.

Case study 1: Showing the passion of one female ETS rider for her work

Josephine Mupeta, a 55-year-old ETS rider from Musamani Health Facility in Serenje explained her passion for being an ETS rider for many years despite her age.

“I lost two relatives when they were giving birth because there was no transport to take them to the nearest health facility. They both lived far away from the health facility. After their death, I vowed to myself that I would help communities in whatever way I can. Being an ETS rider has been a fulfilling journey. It is tough to ride because of the terrain but I am able to ride through because I want to help people in my community.”

3.2.7 Objective 3: Changes in gender empowerment and in social inclusion of disadvantaged families

On the aspect of gender empowerment, questions asked to CHVs at midline were slightly different from what was asked at baseline and thus comparisons cannot be made. At midline female CHVs were asked if they felt that they have a stronger voice at community level because of trainings and 97.8% (N= 268) reported in the affirmative. This comprised 97.9% in demonstration districts and 96.2% in NSU districts. All the CHVs except the ETS riders were asked if they thought that female community members have more independence to make health decisions. The results are depicted on Table 17 below.

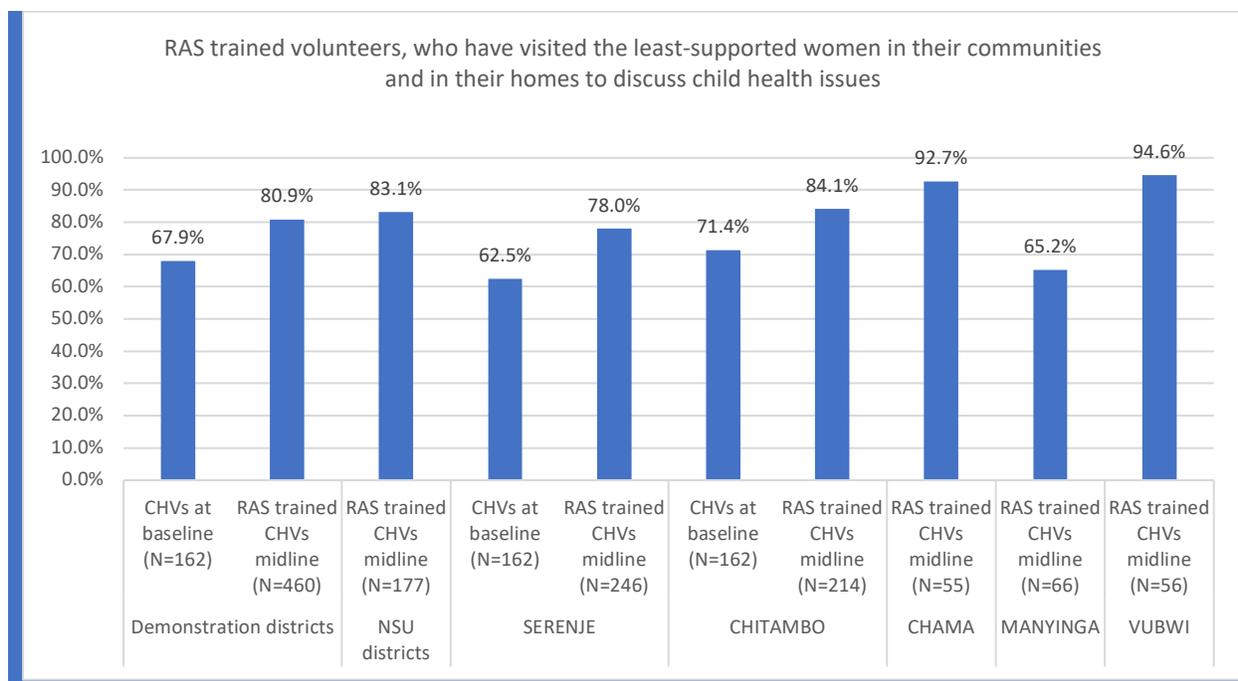
Table 17: Female voices and decision making

	As a female CHV, do you feel that you have a stronger voice at community level because of your training		CHVs who thought that female community members have more independence to make health and other decisions within their households as a result of the community mobilisation activities in their communities		
	Female	Male	Female	Male	Total
Demonstration districts	97.9%	95.0%	94.2%		94.6%
NSU districts	96.2%	81.8%	96.2%		84.0%
All districts	97.8%	90.3%	94.4%		91.9%
SERENJE	99.3%	97.2%	95.9%		96.5%
CHITAMBO	95.9%	92.4%	91.8%		92.1%
CHAMA	100%	90.9%	100%		91.1%
MANYINGA	88.9%	62.5%	88.9%		66.2%
VUBWI	100%	100%	100%		100%

Most of the CHVs, 91.9% (90.3% males and 94.4% females) felt that female community members have more independence to make health and other decisions within their households because of the community mobilization activities in their communities. Comparing the demonstration districts to NSU districts, CHVs who thought that female community members have more independence to make health-related decisions were mostly in demonstration districts than NSU districts (94.6% vs 84.0%).

RAS trained CHVs were asked if they had visited the least-supported women in their communities to discuss child health issues and 81.5% (80.9% in demonstration districts and 83.1% in NSU districts) reported in the affirmative. Comparing CHVs at baseline and the RAS trained CHVs at midline, the results show that the proportion of CHVs who had purposefully set out to visit and include the least-supported women has significantly improved ($p < 0.05$) from 67.9% at baseline to 80.9% at midline. Analysis by district shows that more RAS trained CHVs who had visited the least-supported women to discuss child health issues were in Vubwi (94.6%), followed by Chama (92.7%), Chitambo (84.1%) and Serenje (78.0%). Figure 12 below shows the results in detail.

Figure 12: RAS trained volunteers, who have visited the least-supported women in their communities and in their homes to discuss child health issues



The results show that in addition to providing transport to health facilities, ETS riders also support least supported women in their communities. When asked about the specific actions taken to support least-supported women in their communities, most of the CHVs 33.3% (39.9% demonstration districts and 13.4% in NSU districts) mentioned that they provide food stuffs e.g. mealie/maize/cassava, this is followed by 32.1% (62.7% NSU districts and 21.9% in demonstration districts) who mentioned that they conduct health talks/provide health advice, 16.4% (17.7% in demonstration districts and 12.7% in NSU districts) mentioned that they provide transport to health facilities to the least-supported women. Analysis by district (see table 19 below) shows that food provision to the least-supported women was most in Serenje (47.5%) and Chitambo (30.6%) which were demonstration districts. Table 19 shows the results at midline.

Table 18: Action taken by CHVs to support the least supported women in their communities

	All CHVs	District type		District				
		Demonstration districts	NSU districts	CHAM A	CHITAMBO	MANYING A	SERENJE	VUBWI
N	535	401	134	47	180	44	221	43
Conducting health talks/provide health advice	32.1%	21.9%	62.7%	68.1%	18.3%	61.4%	24.9%	58.1%
Provide transport to health facilities	16.4%	17.7%	12.7%	17.0%	24.4%	6.8%	12.2%	14.0%
Provide food stuffs e.g. mealie/maize/cassava	33.3%	39.9%	13.4%	12.8%	30.6%	11.4%	47.5%	16.3%
Help them with farm works	1.3%	1.7%	0.0%	0.0%	3.3%	0.0%	0.5%	0.0%

Help them with water, firewood and washing	3.4%	4.0%	1.5%	2.1%	6.1%	2.3%	2.3%	0.0%
Provide clothes	2.1%	2.7%	0.0%	0.0%	3.3%	0.0%	2.3%	0.0%
Provide money/medicines	5.0%	4.7%	6.0%	0.0%	2.8%	18.2%	6.3%	0.0%
Provide soap	1.3%	1.2%	1.5%	0.0%	1.1%	0.0%	1.4%	4.7%
Regular visits	5.0%	6.0%	2.2%	0.0%	10.0%	0.0%	2.7%	7.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Case Study 2: Showing how CHVs help least-supported women in their communities

A 52-year-old male ETS rider from Kashishi Rural Health Post in Serenje has been a volunteer for the past 10 years. He expressed his passion for assisting the community and the desire to continue his work by providing ETS services. In addition, he indicated that he also assists the least supported women. He narrated how he helped a mother who gave birth to triplets in 2019. He provided ETS services to the mother who was one of the least supported women in his community and in addition provided her with clothes for the three children that she gave birth to as his personal donation.

In terms of the CHVs' perceptions about fewer children facing delays in going to the health facility when they are suspected of having malaria, the proportion increased significantly ($p < 0.05$) from baseline (75.0%) to midline (78.4%) within the demonstration districts. The results also show that more CHVs in demonstration districts (78.4%) than CHVs in NSU districts (50.9%) felt that fewer children are facing delays. Furthermore, more CHVs (78.9%) in the demonstration districts thought that families are less reliant on traditional medicine at midline which is significantly different from 75.0% at baseline. See table 19 below for the detailed results.

CHVs were also asked for their perceptions about the least-supported women in their communities being reached and included in the child health activities. The results show a statistically significant ($p < 0.05$) difference, from baseline (83.3%) to midline (97.8%) in the demonstration districts. Comparing NSU districts and demonstration districts, more CHVs (97.8%) in demonstration districts than in NSU district (91.7%) felt that the least supported women in their communities were reached. A more detailed picture can be shown by Table 19 below.

Table 19: Delays of children to the health facility and rely on traditional medicine to treat malaria

	Survey point	N	RAS trained CHVs who thought that fewer children are being delayed in going to the health facility when they are suspected of having malaria	RAS trained CHVs who thought that families in their communities are relying less on traditional remedies to treat malaria	RAS trained CHVs who thought that the least-supported women in their communities have been reached and included in the child health activities
District type	Demonstration districts	Baseline	24	75.0%	83.3%
		Midline	454	78.4%	97.8%
	NSU districts	Midline	169	50.9%	91.7%

District			Percentage			
			Baseline	Midline	Baseline	Midline
SERENJE	Baseline	11	72.7%	72.7%	90.9%	
	Midline	240	69.2%	75.4%	95.8%	
CHITAMBO	Baseline	13	76.9%	76.9%	76.9%	
	Midline	214	88.8%	82.7%	100%	
CHAMA	Midline	56	51.8%	42.9%	91.1%	
MANYINGA	Midline	65	43.1%	67.7%	86.2%	
VUBWI	Midline	48	60.4%	95.8%	100%	

3.3 Objective 4: The impact of COVID-19 on the provision of services

3.3.1 Impact on service provision by HFs

The survey incorporated a number of questions to assist in determining whether COVID-19 was having an impact on service provision by HFs. Foremost, a greater proportion 84.1% (91.7% demonstration districts and 75% in NSU) of HFs mentioned that they have experienced disruptions in supplies of medicines and other essential services. All the HFs in Chitambo and Vubwi mentioned that they have experienced disruptions in the supply of medicines.

Facilities were also asked if they have suspended or scaled down on community level activities due to COVID-19. Most of them, 61.4% (70.8% demonstration districts and 50% NSU districts) mentioned that they have scaled down. They furthermore indicated that there has been a notable negative change in people accessing growth monitoring (25%) followed by child health clinics and immunisation services (23.3%). Table 20 below shows the results in detail.

Table 20: Impact of COVID-19 on health facilities

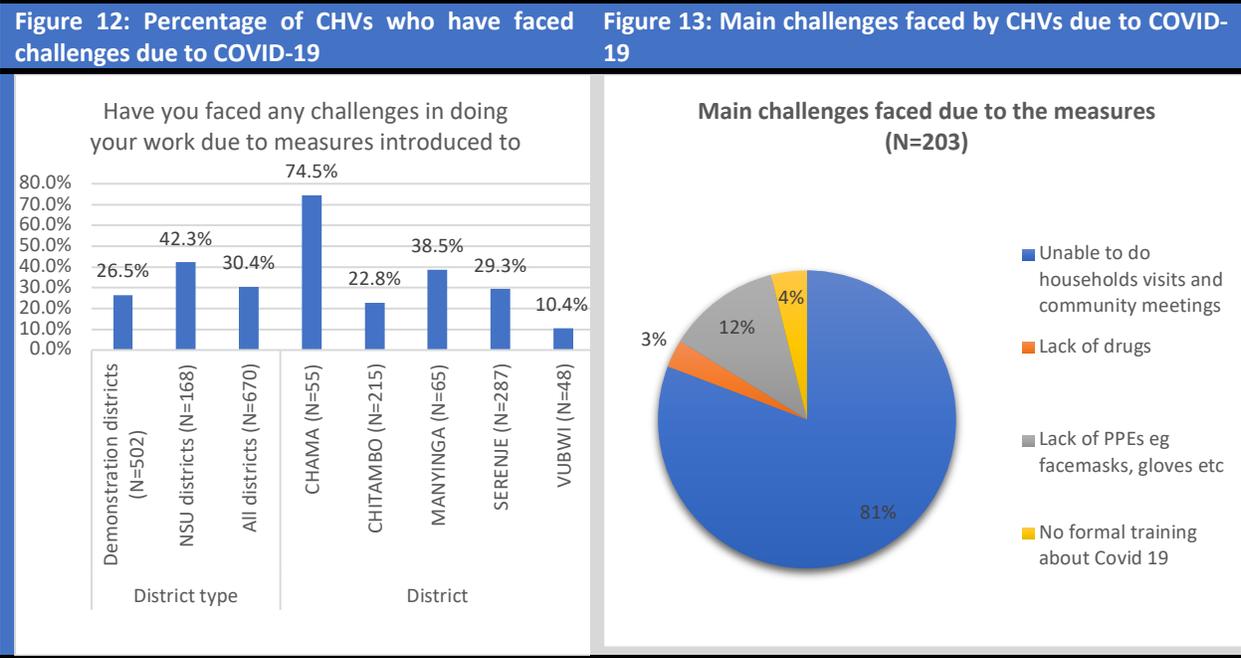
	district type			District					
	Demonstration districts	NSU districts	All districts	Chama	Chitambo	Manyinga	Serenje	Vubwi	
N	24	20	44	5	8	5	16	10	
Have you experienced any disruption in supplies of medicines and other essential consumables due to COVID-19?									
Yes	91.7%	75.0%	84.1%	40.0%	100%	60.0%	87.5%	100.0%	
No	8.3%	25.0%	15.9%	60.0%	0.0%	40.0%	12.5%	0.0%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	
Have you suspended or scaled down on community level activities due to COVID-19									
Yes	70.8%	50.0%	61.4%	20.0%	50.0%	80.0%	81.3%	50.0%	
No	29.2%	50.0%	38.6%	80.0%	50.0%	20.0%	18.8%	50.0%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	
Percentage of HFs who have experience reductions in volumes of the people seeking the following:									
ANC	12.5%	15.0%	13.6%	0.0%	0.0%	20.0%	18.8%	20.0%	
Immunisations	25.0%	21.1%	23.3%	40.0%	0.0%	20.0%	37.5%	11.1%	
Deliveries	4.2%	15.0%	9.1%	20.0%	0.0%	20.0%	6.3%	10.0%	

Child Health clinics	29.2%	15.8%	23.3%	20.0%	0.0%	20.0%	43.8%	11.1%
Growth monitoring	29.2%	20.0%	25.0%	20.0%	0.0%	40.0%	43.8%	10.0%

3.3.2 Impact of COVID-19 at community level

The survey sought to determine whether the measures introduced to curb the spread of coronavirus (COVID-19) were negatively affecting the activities of CHVs at community level. A total of 30.4% (42.3% NSU districts and 26.5% demonstration districts) mentioned they faced challenges. The results show a statistically significance ($p < 0.05$) difference between demonstration districts and NSU districts. Most of the CHVs in Chama (74.5%) followed by Manyinga (38.5%) and Serenje (29.3%) faced challenges due to the introduced measures. Analysis by gender shows a significant relationship ($p < 0.05$) between the CHVs who mentioned that they faced challenges in doing their work and the gender, with more males (32.9%, $N=474$) than females (23.5%, $N=307$) mentioning that they have faced challenges due to COVID-19 measures. Figure 13 below shows the results.

When asked about some of the challenges that they face, 81% of CHVs mentioned that they were unable to do household visits and community meetings to the extent that they would have wanted, 12% mentioned that they do not have PPE (e.g. facemasks and gloves) and 4% mentioned they lack formal training on COVID 19. Some of the CHVs who mentioned inability to do community meetings indicated that people/parents are a bit scared of them coming to do visits. Among the 12% who mentioned lack of face masks, some also mentioned that even community members ask for the PPE which they themselves do not have. The project guidelines state that household visits can be undertaken if social distancing protocols are followed and discussion takes place outside. This is to minimise disruption of activities and avert possible surges in malaria case fatalities.

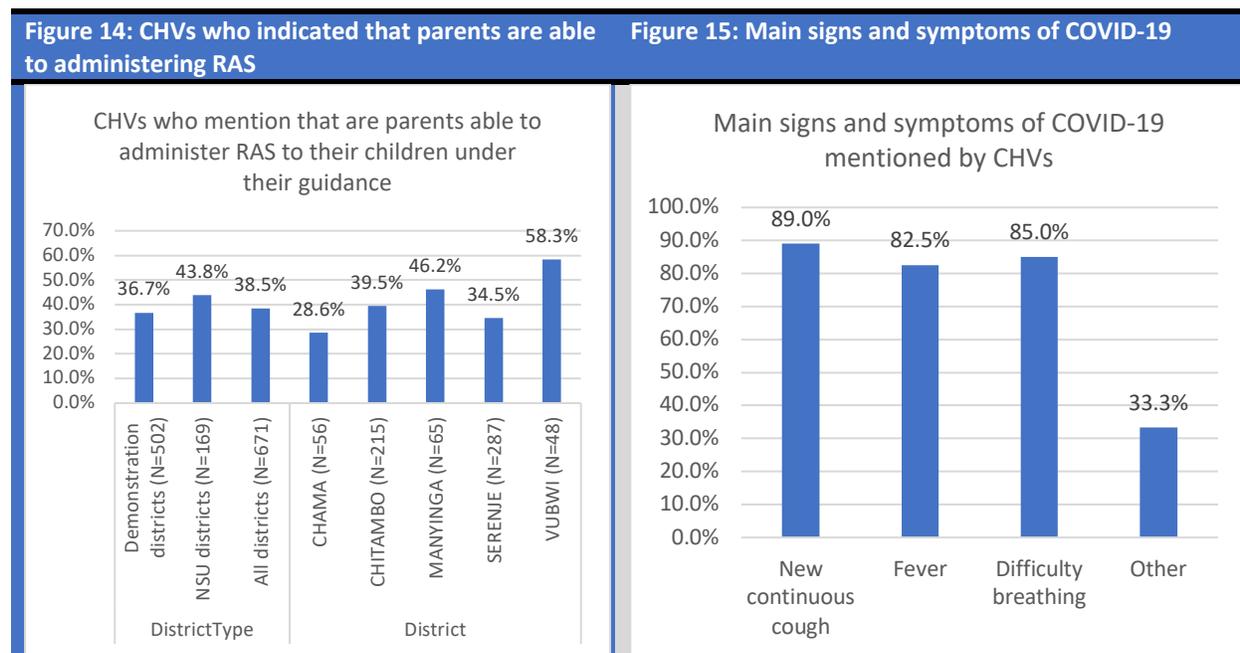


Due to COVID-19, CHVs have been advised to administer RAS if they have gloves, but to ask the child’s carer to administer the drug if they lack these. CHVs were therefore asked if parents were able to

administer RAS to children under their guidance. A total of 38.5% (43.8% NSU districts and 36.7% in demonstration districts) mentioned that parents were able to administer RAS under CHV guidance. The relationship between type of district and the CHVs who mentioned that parents were able to administer RAS in their guidance was statistically significant ($p < 0.05$). Analysis by district show that 58.3% of CHVs in Vubwi felt that parents could administer RAS, followed by Manyinga (46.2%) and Chitambo (39.5%) (Figure 15).

CHVs who mentioned that parents cannot administer RAS to their children under their guidance were further asked about the measures that they have taken to ensure that RAS was eventually administered before referring the child to the health facility. Most of the CHVs (67.9%, $N=474$) mentioned that they take all other COVID-19 precautions and administer RAS, followed by 17.7% who mentioned that nothing is done¹⁹ and 11.8% who refer to another CHV.

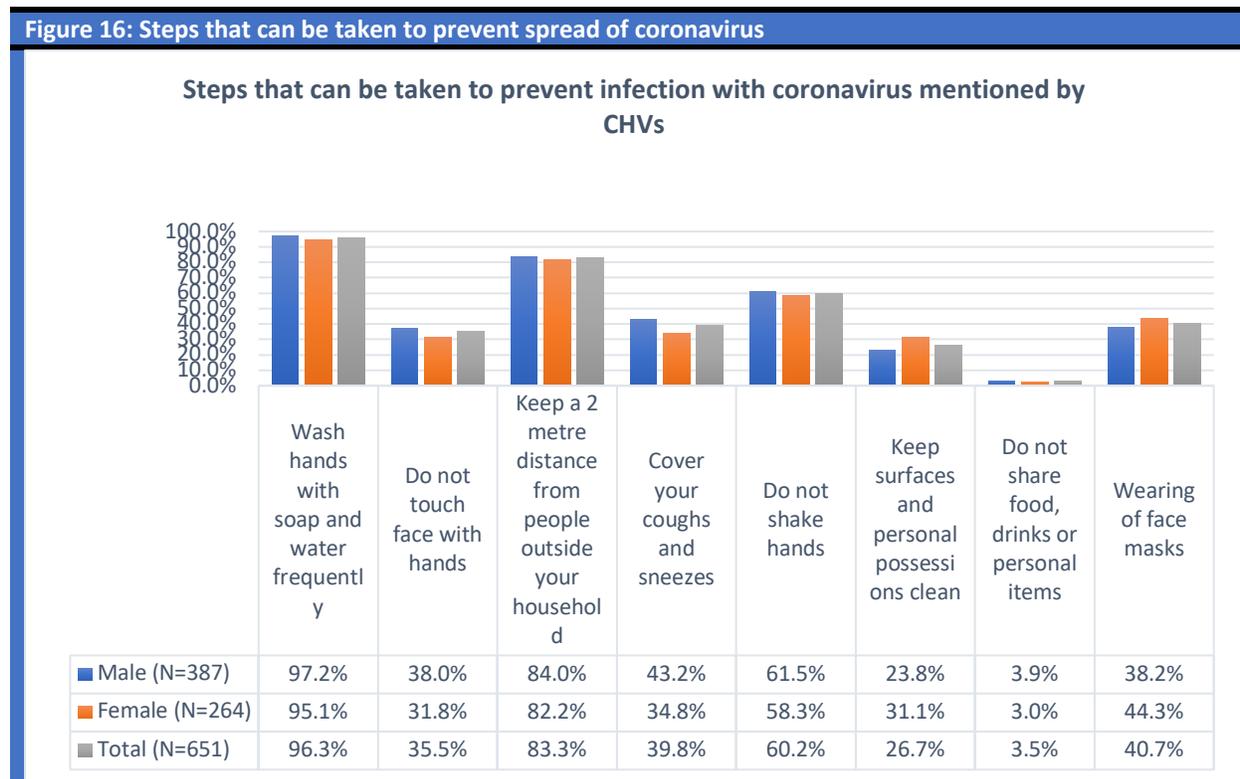
A total of 93.6% (94.6% demonstration districts and 90.5% in NSU districts) of the CHVs mentioned that they are confident that they know the main signs and symptoms of coronavirus (COVID-19). The difference between the proportion of CHVs in NSU districts and demonstration districts was statistically significant ($p < 0.05$). Analysis by gender did not show much variation ($p = 0.126$), the confidence in knowing the main signs and symptoms of COVID-19 was the same between males and females. CHVs were further asked to list all the signs and symptoms of COVID-19 they know (see Figure 16 below). The most mentioned sign/symptom of COVID-19 was new continuous cough (89.09%).



In terms of steps that can be taken to prevent infection with coronavirus (COVID-19), the most mentioned was washing of hands with soap and water frequently (96.3%), followed by keeping a 2-meter distance

¹⁹ Data to ascertain the number of children who might have missed out on RAS when nothing was done was not collected during the survey

from people outside the community (83.3%) and not shaking hands (60.2%). Analysis by gender shows some variation on the CHVs that mentioned wearing of facemasks, more females (44.3%) than males (38.2%) mentioned wearing of face masks as a step taken to prevent infection with coronavirus (Figure 17).



Data on gender-based violence (GBV) in the context of COVID-19 was collected from the CHVs. The term gender-based violence (GBV) refers to violence that targets individuals or groups based on their gender²⁰. When CHVs were asked if they thought that GBV is rising in their communities, only 16.7% responded in the affirmative and 30.4% of these felt that GBV was increasing because of the changes and challenges brought about by coronavirus (COVID-19). There was a statistically significant correlation ($p < 0.05$) between CHVs who mentioned that GBV is rising and gender of the CHVs. More females CHVs (21.3%, N=268) than male CHVs (13.6%, N=403) mentioned that GBV is rising in their communities. Most of the CHVs (83.3%) said 'No' when asked if they felt that GBV is rising their communities. Among these CHVs who felt that GBV was not rising in their communities, 83.2% mentioned that GBV has fallen in their communities over the past couple of years. The figures below shows the results in detail.

²⁰ <https://www.thenewhumanitarian.org/feature/2004/09/01/definitions-sexual-and-gender-based-violence#:~:text=Definitions%20of%20sexual%20and%20gender-based%20violence%201%20Gender-based,likely%20to%20result%20in%2C%20...%20More%20items...%20>

Figure 17: CHVs who mentioned that Gender Based Violence is rising in their communities

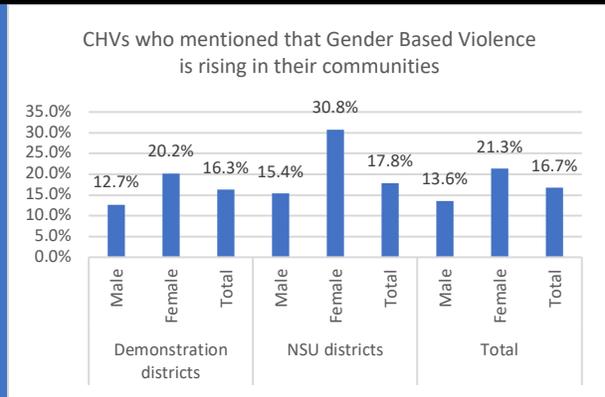


Figure 18: CHVs who mentioned that GBV is increasing because of the changes and challenges brought about by coronavirus (COVID-19)

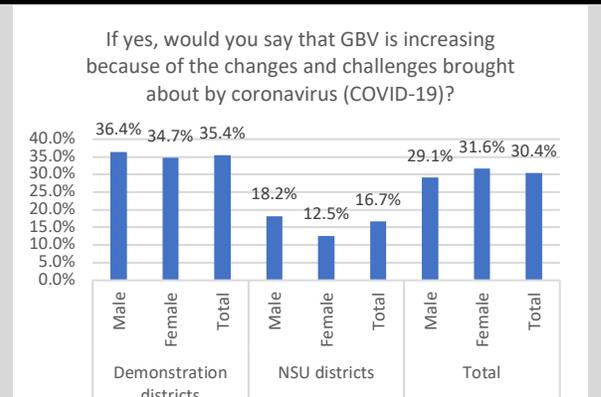
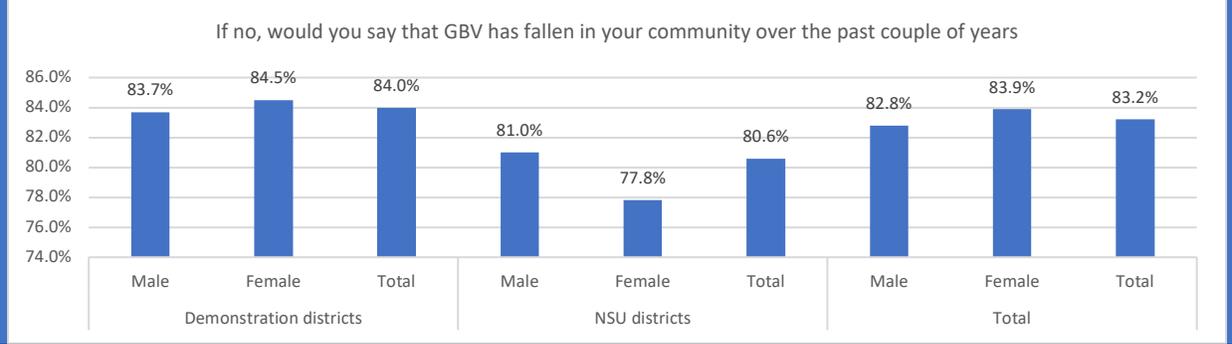
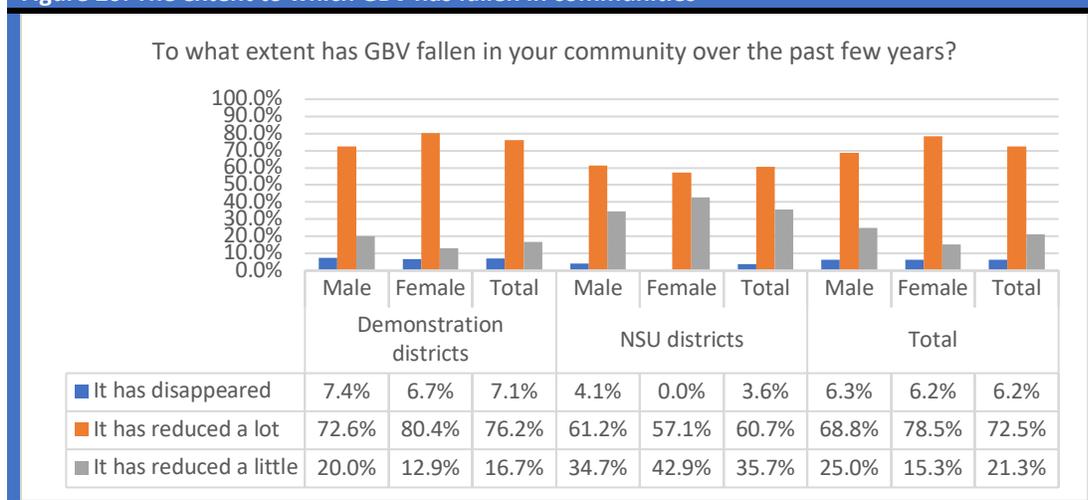


Figure 19: CHVs who mentioned that GBV has fallen in their communities over the past years



CHVs who indicated that GBV had actually fallen were further asked to rate the extent to which GBV had fallen. Most of the CHVs (76.2%) (80.4% females and 72.6% males) mentioned that GBV has reduced a lot followed by 16.7% (20% males and 12.9% females) who mentioned that it has reduced a little and only 7.1% (7.4% males and 6.7% females) mentioned that it has disappeared. Comparing demonstration and NSU districts, GBV is more widely perceived to have reduced a lot in demonstration districts (76.2%) compared to NSU districts (60.7%). See figure 21 below for detailed results.

Figure 20: The extent to which GBV has fallen in communities



3.4 Objective 5: Contribution to reduction in mortality due to severe malaria in children

3.4.1 Incidence of malaria

The study sought to determine whether there were any changes in the incidence of malaria from the commencement of the project until the midline. A total of 102, 814 and 73, 464 malaria cases were recorded at midline in demonstration districts and NSU districts respectively. When comparing health facilities which were visited at baseline and then visited again at midline, the results show an increase of 13.1% (9,266) from 70,563 in 2018 to 79,829 in 2019. Figure 22 below shows the average malaria cases per year for the facilities which were visited at baseline and then at Midline.

The highest peak of malaria cases in 2019 were from January to June, as shown in Figure 19 below and Table A 6 in the annexes. Figure 19 depicts the incidence of malaria cases in the demonstration districts (Serenje and Chitambo).

Figure 21: Average malaria cases per year

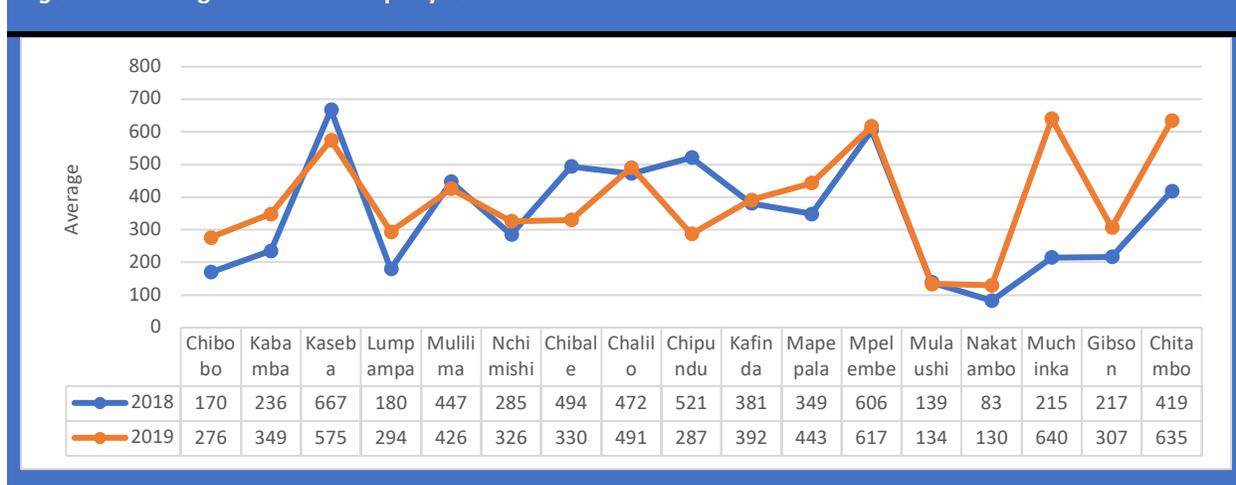


Figure 22: Malaria trends in Demonstration districts

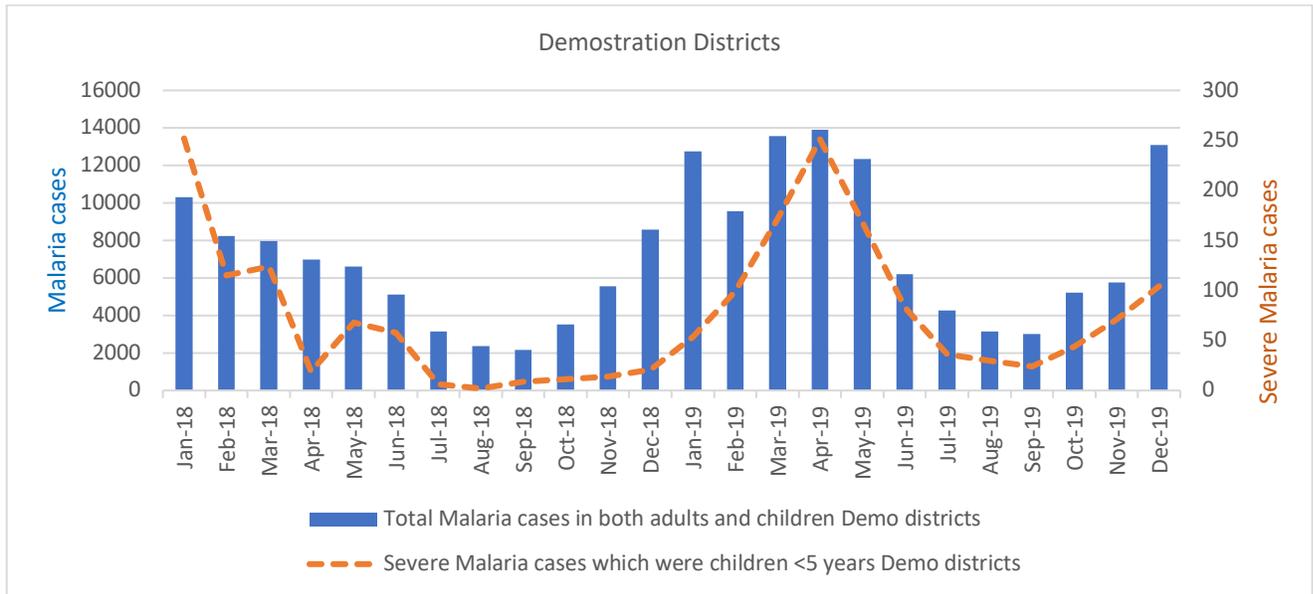
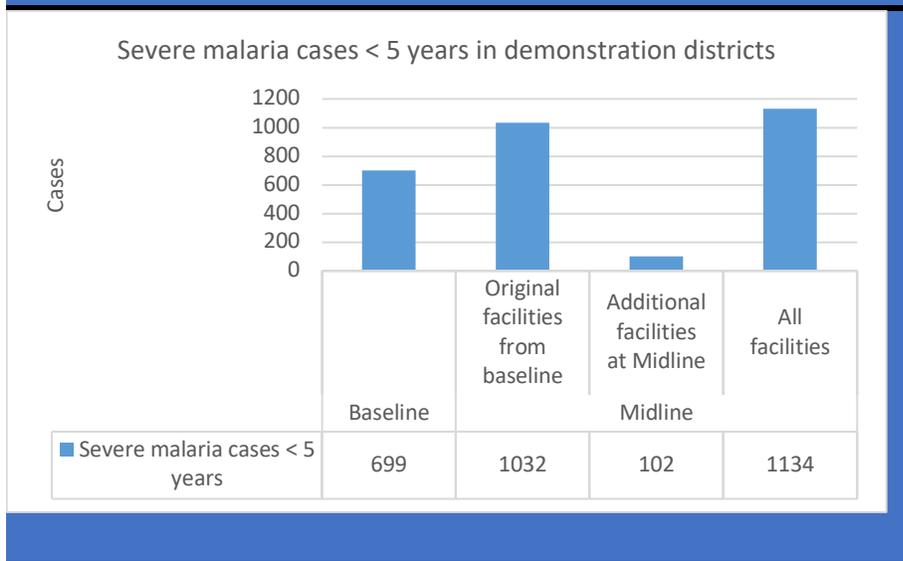


Figure 23: Severe malaria cases < 5 years in demonstration districts



Moreover, severe cases among the children under 5 years in the demonstration districts increased. Comparing health facilities seen at baseline and at midline as well, the results show an increase of 699 severe cases in 2018 to 1032 in 2019, see figure 24. Just like the malaria cases, the peak increase of the severe malaria cases for children under 5 years was recorded from

January to June 2019.

Total and severe cases in NSU districts (Jan – Dec 2019)

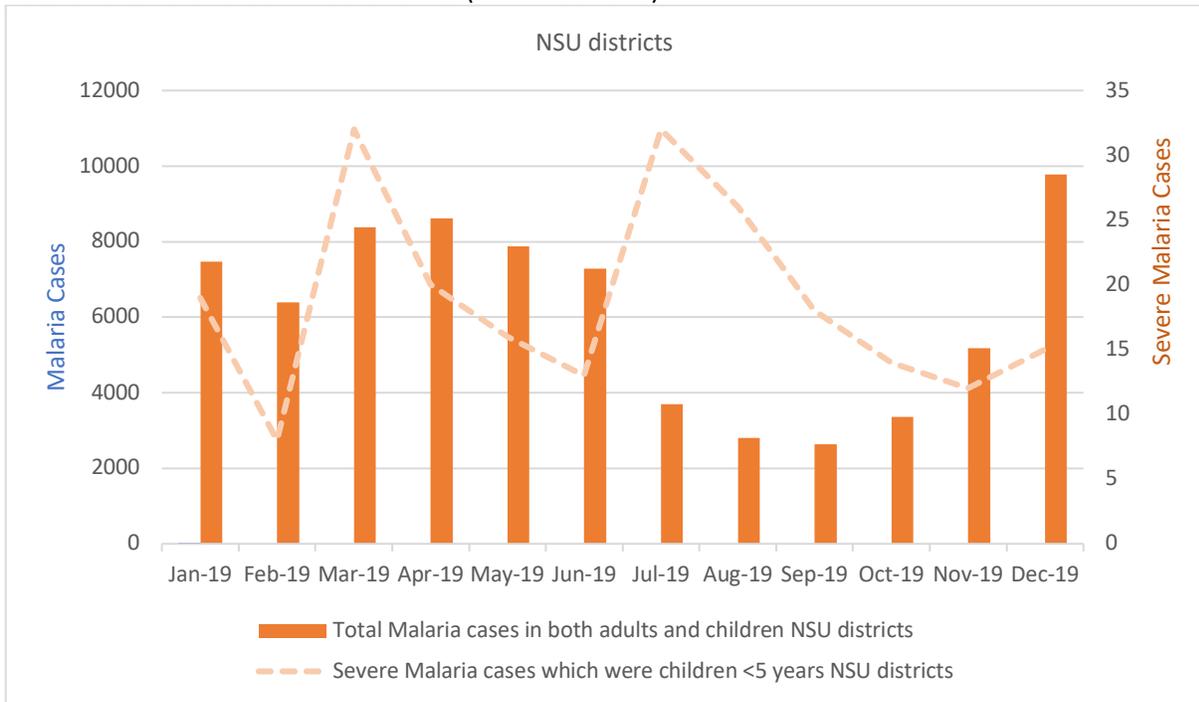


Figure 24: Total and severe cases in NSU districts (Jan – Dec 2019)

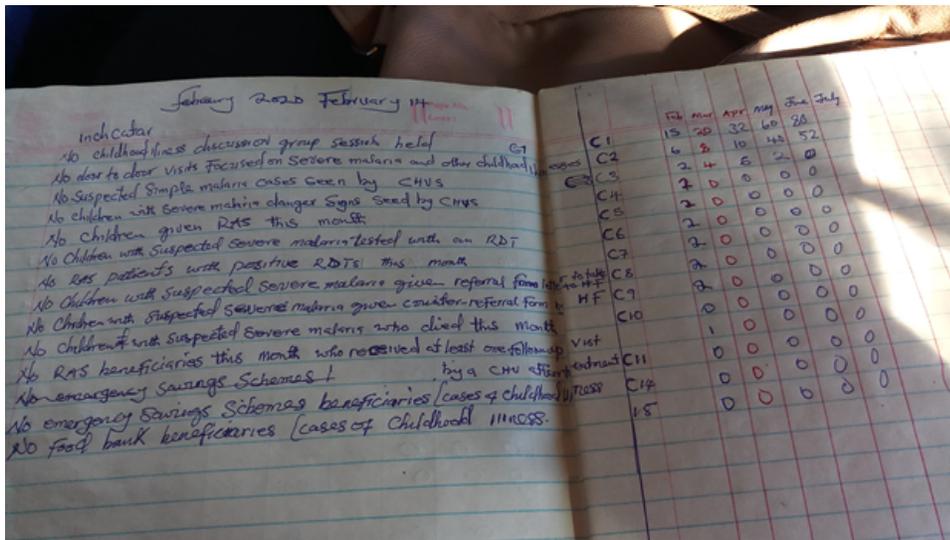
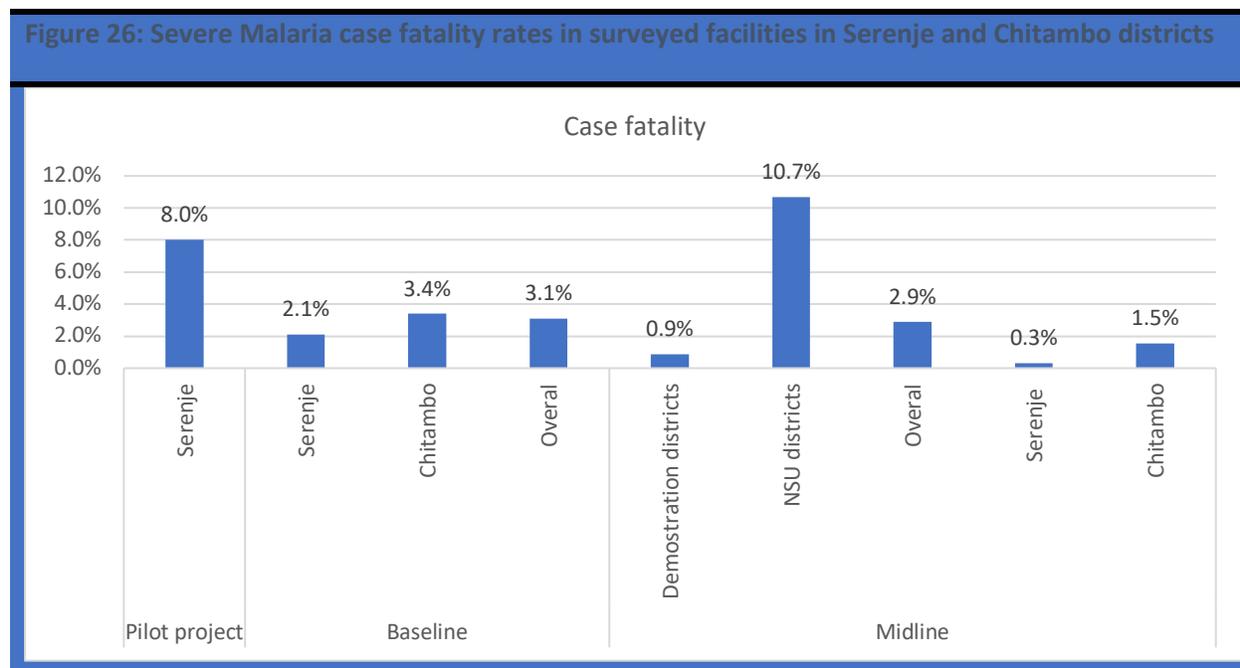


Figure 25: Record keeping of malaria cases by a CHV

3.4.2 Malaria case fatality

The study also sought to determine the impact of the project, (i.e. the number of lives saved among children aged 6²¹ months to 6 years old) by reviewing the case fatality rate. The midline utilized audited severe malaria deaths from the DHMTs. During the period of January to December 2019, a total of 15 cases of severe malaria deaths were recorded in the demonstration districts. In Serenje, DHMT data shows that two (2) deaths occurred during the period specifically in Kaseba and Nchimishi. The total 15 death comprises of 13 deaths in Chitambo and 2 deaths in Serenje. In Chitambo, the number of deaths specified by the DHMT in 2019 is 13. Further investigations have revealed that this figure includes five (5) duplicated²² deaths (i.e. the deaths were recorded in Gibson and in Mpelembe). However, in the audit report, it is stated that these are duplicates. Hence there were 8 severe malaria deaths among children in this district in 2019. This gives a total of 10 recorded malaria deaths in 2019 in the two demonstration districts. Case fatality of 0.9%% in the demonstration districts was noted and this was lower than the baseline findings (3.1%). Further analysis shows that there was much improvement in Serenje (case fatality declined from 2.1% to 0.3) as compared to Chitambo. In Chitambo case fatality dropped from 3.4% to 1.5%.



²¹ Although the MAM project targets children 6 months to 6 years, HMIS data is collected for children between 0-1; and 1-5 years of age. Case fatalities are, therefore approximated from these data.

²² Officially these cannot be removed until the District Health Information Officer removes them from the HMIS.

4 Conclusions and Recommendations

The midline survey was successfully carried out and brings out important issues especially as preparations for the next project phase are underway.

Conclusion 1: The project has been intervening at facility level in order to optimise case management of severe malaria and increasing access to Inj AS at HFs. In all the districts, although >40% of the visited health facilities had all the five malaria drugs available at HF level at the time of the survey, Inj AS was limited in supply. Limited supplies of Inj AS at the time of the midline survey can be attributed to procurement and distribution challenges due to the COVID-19 pandemic and were expected to be stable. However, the possibility of shortages of Inj AS have been raised on other platforms.

Recommendation: *The project has to continue monitoring the availability of Inj AS and engaging relevant authorities especially NMEC in an effort to avert possible shortages especially in the project districts.*

Conclusion 2: Results show that overall, there are improvements in terms of availability of at least one staff member trained on Inj AS. The reduction in the percentage of trained staff especially in the demonstration districts needs to be carefully monitored though. Although all HFs in NSU districts have at least one staff member trained on Inj AS, there are staff members who still require training or have no experience in terms of managing cases of severe malaria.

Recommendations: *The reduction in trained staff, coupled with the presence of staff who have not been trained on how to handle cases of severe malaria calls for more training sessions if resources permit. The results should also be shared with the DHMTs so that they are aware of the situation and understand the implications.*

Conclusion 3: The project has done significantly well in improving knowledge about simple and severe malaria among CHVs. This is critical for the speedy identification of cases and the ultimate success of the project. The very high knowledge levels in Serenje provide critical evidence of the effectiveness of project strategies over time. Similarly, confidence levels have gone up among CHVs on the administration of RAS. The combination of high knowledge levels and high confidence levels offer a good platform for addressing future cases of malaria and averting possible deaths especially in children in the project areas. This is further enhanced by the notable improvements in the referral systems and subsequent follow-ups of clients. Challenges due to external and internal factors were shared by CHVs and these need to be addressed appropriately.

Recommendations:

- *The work carried out by the CHVs is commendable and as such there should be support from the project in terms of further assessing the challenges they have highlighted. The project can address challenges that are within the project's mandate and highlight those that are external to the project with relevant stakeholders.*
- *Challenges encountered by a smaller number of CHVs in administering RAS need to be addressed for better outcomes of the project.*

- *The assumption made by the project that carers can administer RAS under the guidance of CHVs needs to be further evaluated to determine its relevance especially in the light of the results of this study.*

Conclusion 4: The ETS is working well and ETS riders have continued to provide an essential service in their communities. This is despite the long distances and poor terrain that they have to navigate. The riders have remained passionate about their work even though they have difficulties working at night and during the rainy season.

Recommendation: *Provision of necessary items like torches and raincoats will go a long way in encouraging them to effectively continue their activities even during the rainy season and at night.*

Conclusion 5: There have been significant positive changes in gender empowerment and social inclusion of disadvantaged women and their families. Having more female CHVs with a stronger voice in their communities is an enabling factor for the ultimate achievement of the project goal and this also opens up other development opportunities for women. This is further complemented by more women being able to make health related decisions at household level. It is thus fitting that there are fewer delays in sending children to HFs for further treatment. In relation to social inclusion, the evidence points to the fact that CHVs are taking proactive steps to include the least-support women and children in their activities. This is important since it is this group that tends to carry the highest burden of mortality and morbidity.

Recommendations: *CHVs including ETS riders should continue with their commendable efforts of assisting all those who need their assistance.*

Conclusion 6: As would have been expected, COVID-19 is having a negative impact on service provision at both health facility and community levels. Although some activities are happening at a lower scale, it is pertinent to note that strategies are in place for engagements at household and community levels. RAS is still being administered to save lives but concerns have been raised regarding the lack of PPE. On the other hand, the volume of people seeking pre and post natal services for themselves and their children babies have gone down.

Recommendations:

- *PPE is expected to enable the CHVs to administering RAS without necessarily asking the child's carers to administer it.*
- *HFs should come up with innovative strategies of providing essential services during these COVID-19 times as to avoid having other pandemics as a result of not having appropriate services. The results of this study showing the reductions can be used as a basis for lobbying for the adoption of innovative approaches for service delivery.*

Conclusion 7: There is a reduction in child mortality due to severe cases of malaria. This can be attributed to the positive changes brought about by the project. This is more apparent in the demonstration districts

where there is a much higher coverage and longer engagement. This is a good position as the project prepares to transit to the next project phase.

***Recommendation:** Continue with the planned project implementation as strategies are bringing about the desired change.*

Conclusion 8: There is a significant improvement on malaria case referrals by CHVS (i.e. community to Health facilities) from baseline to the midterm review. The use of pages from CHV notebooks as referral letters improved by 42.1% points from baseline while use of counter-referral forms at HFs improved by 61.1% with 805 cases issued with counter referral form during baseline which increased to 2072 at midline. Malaria case referrals was further buttressed by CHVs follow visits on patients in the communities.

5 Annexes

5.1 Lives Saved Calculations

The lives saved calculation was based on the GCC impact model. Lives saved was a product of number of children with severe malaria that were transported to facility by ETS (Baseline fatality rate of severe malaria (8%) and relative reduction in case fatality rate attributed to MAM (75%).

5.2 Annex 1: Additional data tables

Table A 1: List of Health Facilities visited during the survey

Chama	Chitambo	Manyinga	Serenje	Vubwi
Chilumbama	Chalilo	Kashiwakaji	Chibobo HP	Songea
Lundu	Chipundu	Chiteve	Kabamba RHC	Maumba
Nthonkho	Chitambo	Luamusongwa	Kaseba HP	Chikoma
Mulilo	Gibson	Luloma mission	Lumpampa HP	Chigwe
Chibale zonal	Kafinda	Chifuwe north	Mulilima RHC	Mlawe
	Mapepala		Nchimishi RHC	
	Mpelembe		Chibale RHC	
	Mulaushi		Kabundi RHC	
	Nakatambo		Kalela RHP	
	Muchinka		Kashishi RHP	
			Mpepetwe	
			Miswema	
			Mailo	
			Chisomo RHC	
		Sote		
5	10	5	15	5

Table A 2: Staff Availability at Health Facility Level

		Doctors	Clinical officers	Nurses	EHT	Trainees	CHAs	CDEs	Other staff
Demonstration districts	Baseline	1	21	46	18	1	13	30	10
	Midline	2	27	92	17	1	25	32	11
NSU districts	Midline	2	16	76	15	2	42	45	9
Total	Baseline	1	21	46	18	1	13	30	10
	Midline	4	43	168	32	3	67	77	20
Serenje	Baseline		4	14	4		4	8	4
	Midline		6	31	6	1	16	14	4

Chitambo	Baseline	1	17	32	14	1	9	22	6
	Midline	2	21	61	11		9	18	7
Chama	Midline		2	7	3	1	6	14	
Manyinga	Midline	2	5	42	3		15	5	4
Vubwi	Midline		9	27	9	1	21	26	5

Table A 3: Drug Stock Levels in Health Facilities (Midline)

Health facility	SP/Fansider	Quinine		Number of packs of COARTEM				Injectable artesunate	Rectal Artesunate ²³
	Bottles of 100 tablets	Bottles of 100 tablets	Quinine injectables	6 tablets	12 tablets	18 tablets	24 tablets	60mg injectables	Number of boxes
Serenje district									
CHIBOBO	5	-	80	-	-	-	150	450	7
KABAMBA	-	-	-	-	-	-	-	-	-
KASEBA	10	-	10	-	-	30	-	-	32
LUMPAMPA	5	-	60	-	-	-	30	300	-
MULILIMA	10	-	6	-	-	300	270	-	73
NCHIMISHI	-	-	30	-	-	150	300	-	49
CHIBALE	-	-	70	-	-	-	2	-	186
KABUNDI	-	-	60	-	-	126	180	-	56
KALELA	10	-	10	-	-	-	30	90	-
KASHISHI	5	-	20	-	-	-	150	150	5
MPEPETWE	-	-	-	-	-	-	-	-	-
MISWEMA	3	-	10	-	-	-	2	-	32
MAILO	20	-	19	-	-	-	3	-	35
CHISOMO	-	-	15	60	-	-	408	-	-
SOTE	5	-	30	-	-	-	-	450	20
NDABALA	3	-	130	-	-	-	30	-	8
KASEBA	1	-	-	-	-	-	-	-	7
Chitambo district									
CHALILO	-	-	150	-	-	30	300	10	327
CHIPUNDU	-	-	100	-	-	60	390	15	183
CHITAMBO	20	-	100	2000	1000	420	1200	40	450
GIBSON	5	-	150	-	-	210	330	450	362
KAFINDA	5	-	10	-	-	-	210	22	217
MAPEPALA	5	-	90	-	-	90	780	-	31

²³ excluding that given to CHVs

MPELEMBE	-	-	15	390	-	150	660	40	360
MUCHINKA	10	-	-	3	32	8	35	6	299
MULAUSHI	10	-	50	90	-	-	300	-	-
NAKATAMBO	3	-	140	240	-	120	570	1050	46
Chama district									
CHIBALE ZONAL	-	-	-	4	4	-	-	-	50
CHILUMBAM A	2	-	-	10	-	7	16	65	42
LUNDU	5	-	-	-	-	8	8	120	-
MULILO	10	-	-	30	30	-	-	-	7
NTHONKHO	-	-	-	-	-	-	-	-	41
Manyinga district									
KASHIWAKAJI	5	-	-	7	1	-	15	-	6
CHITEVE	5	-	-	6	9	-	8	-	4
LUAMUSONG WA	-	-	-	10	-	-	12	1	17
LULOMA MISSION	1	5	-	15	4	-	19	-	-
CHIFUWE NORTH	-	-	-	4	4	52	48	-	142
Vubwi									
SONGEA	1	-	-	24	-	8	20	-	-
MAUMBA	-	-	-	270	600	180	1320	-	-
CHIKOMA	1	-	-	-	-	4	24	-	-
CHIGWE	-	-	-	-	-	30	63	1	25
MLAWE	10	-	-	-	-	43	14	-	-
MZIGAWA	-	-	-	-	-	5	4	60	-
MBANDE	1	-	-	-	-	-	8	60	-
MCHENJEZA	1	-	-	-	-	16	26	90	-
LIKawe	1	-	-	-	-	-	25	2	-
MANOTA	1	-	-	-	-	55	100	1	-
MATEMBA	1	-	-	10	-	47	50	2	-
SINDEMISALE	1	-	-	-	-	63	56	-	1

Table A 4: Distance and Time to the Health Facility

		What is the distance from the central part of your community to the health facility?		How long does it take you to reach the health facility when carrying a patient by bicycle ambulance?		How long does it take you to reach the health facility on foot?	
		Baseline	Midline	Baseline	Midline	Baseline	Midline
Demonstration districts	N	6	50	6	50	6	50
	Average	10.5	11.3	75.8	92.2	143.3	177.1
	Maximum	18	35	130	240	240	480
	Median	11	9.5	75	90	105	140
	Minimum	5	2	10	2	90	4
	Standard Deviation	4.7	6.8	46.1	55.3	72.0	104.6
Serenje	N	3	35	3	35	3	35
	Average	7.7	12.69	78.3	79.6	140	165.4
	Maximum	12	35	130	150	240	480
	Median	6	10	60	90	90	120
	Minimum	5	2	45	15	90	45
	Standard Deviation	3.8	7.26	45.4	34.95	86.6	88.74
Chitambo	N	3	15	3	15	3	15
	Average	13.3	8	73.3	121.6	146.7	204.3
	Maximum	18	15	120	240	230	480
	Median	12	7	90	112	120	210
	Minimum	10	2	10	2	90	4
	Standard Deviation	4.2	4.34	56.9	80.09	73.7	134.19

Table A 5: Knowledge of complicated and uncomplicated malaria

	District Type			District						
	Demonstration districts		NSU districts	SERENJE		CHITAMBO		CHAM A	MANYING A	VUBW I
	Baseline	Midline		Baseline	Midline	Baseline	Midline	Midline	Midline	Midline
N	427	532	188	213	317	214	215	56	66	66
Malaria is caused by mosquito bites	98.1%	99.1%	98.9%	98.1%	100%	98.1%	97.7%	98.2%	100%	98.5%
Malaria is caused by eating immature sugarcane	0.0%	0.4%	0.5%	0.0%	0.0%	0.0%	0.9%	0.0%	1.5%	0.0%

Malaria is caused by eating cold nshima	0.5%	1.1%	0.0%	0.5%	0.0%	0.5%	2.8%	0.0%	0.0%	0.0%
Malaria is caused by Eating other dirty food	2.1%	2.4%	1.1%	1.9%	0.0%	2.3%	6.0%	3.6%	0.0%	0.0%
Malaria is caused by drinking dirty water	3.0%	6.6%	1.1%	3.8%	3.2%	2.3%	11.6%	1.8%	1.5%	0.0%
Malaria is caused by getting soaked with rain	2.6%	2.6%	1.1%	4.2%	1.9%	0.9%	3.7%	3.6%	0.0%	0.0%
Malaria is caused by cold or changing weather	0.7%	3.6%	3.7%	0.5%	2.8%	0.9%	4.7%	10.7%	0.0%	1.5%
Malaria is caused by witchcraft	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%
Malaria is caused by other issue	6.6%	5.5%	4.3%	6.6%	1.3%	6.5%	11.6%	12.5%	1.5%	0.0%
I Don't know the causes of Malaria	0.0%	0.2%	0.5%	0.0%	0.0%	0.0%	0.5%	0.0%	1.5%	0.0%
Knowledge of the signs and symptoms of malaria in children	95.3%	99.6%	97.3%	93.4%	100 %	97.2%	99.1%	100%	92.4%	100%
Self-confirmed knowledge about the danger signs of severe malaria in children?	71.1%	99.8%	99.5%	68.5%	100 %	73.7%	99.5%	100%	98.5%	100%
Knowledge of fever as malaria danger sign	36.1%	93.4%	83.4%	38.4%	97.8 %	33.8%	86.9%	67.9%	84.6%	95.5%
Knowledge of unconscious or Lethargic as malaria danger sign	32.8%	75.7%	60.4%	28.4%	74.8 %	37.1%	77.0%	51.8%	76.9%	51.5%
Knowledge of not able to drink or eat as malaria danger sign	17.3%	85.3%	56.7%	16.1%	87.4 %	18.6%	82.2%	60.7%	64.6%	45.5%
Knowledge of Vomiting everything as malaria danger sign	32.5%	93.0%	79.7%	35.5%	96.5 %	29.5%	87.8%	80.4%	84.6%	74.2%
Knowledge of fitting as malaria danger sign	53.2%	93.6%	85.6%	47.9%	95.0 %	58.6%	91.5%	98.2%	69.2%	90.9%

Table A 6: Recorded malaria cases January 2018 - December 2019

	Month	Total Malaria cases in both adults and children			Total Malaria cases in children <1 year			Total Malaria cases in children <5 years			Severe Malaria cases which were children <5 years			Deaths attributed to malaria which were of children < 1 year			Deaths attributed to malaria which were of children < 5 years		
		Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline	Demo districts	NSU districts	Midline
Baseline period	Jan-18	10303			1225			3125			252			1			1		
	Feb-18	8240			486			2138			115			2			1		
	Mar-18	7954			684			2025			124			0			1		
	Apr-18	6996			556			1946			19			3			2		
	May-18	6606			593			2079			68			1			1		
	Jun-18	5104			470			1703			58			0			1		
	Jul-18	3148			350			833			6			0			1		
	Aug-18	2372			282			670			2			0			0		
	Sep-18	2176			233			708			9			1			0		
	Oct-18	3525			361			1076			11			0			1		
	Nov-18	5568			411			1749			14			0			2		
	Dec-18	8571			527			2584			21			2			1		
	Total	70563			6178			20636			699			10			12		
Midline period	Jan-19	12764	7475	20239	747	275	1022	3012	1624	4636	53	19	72	0	0	0	2	0	2
	Feb-19	9573	6385	15958	671	273	944	2796	1584	4380	99	8	107	0	0	0	0	2	2
	Mar-19	13554	8384	21938	858	351	1209	3605	2174	5779	171	32	203	1	0	1	1	0	1
	Apr-19	13919	8608	22527	821	439	1260	3416	2112	5528	251	20	271	0	0	0	0	1	1
	May-19	12346	7874	20220	1042	380	1422	3362	2332	5694	168	16	184	0	0	0	1	0	1
	Jun-19	6208	7283	13491	514	342	856	1752	2003	3755	83	13	96	0	0	0	0	0	0
	Jul-19	4253	3691	7944	270	341	611	1330	1122	2452	36	32	68	0	0	0	0	0	0
	Aug-19	3152	2810	5962	225	272	497	910	878	1788	30	26	56	0	0	0	0	0	0
	Sep-19	3003	2629	5632	239	201	440	1076	976	2052	24	18	42	0	1	1	1	1	2

Oct-19	5223	3362	8585	331	185	516	1772	982	2754	44	14	58	0	0	0	0	0	0
Nov-19	5747	5186	10933	521	334	855	1667	1224	2891	71	12	83	0	0	0	3	9	12
Dec-19	13072	9777	22849	649	689	1338	3731	2391	6122	104	15	119	3	0	3	3	0	3
Total	102814	73464	176278	6888	4082	10970	28429	19402	47831	1134	225	1359	4	1	5	11	13	24

Source: HMIS and health facility records

Table A 7: Years and Time CHVs Spend on Volunteering

Indicator	Baseline		Midline
	Demonstration districts	Demonstration districts	NSU districts ²⁴
Average years spent volunteering (male CHVs)	7.8	7.2	5.2
Average years spent volunteering (female CHVs)	7.2	5.7	4.9
Average years spent volunteering (male ETS riders)	2.6	7.3	3.4
Average years spent volunteering (female ETS riders)	-	6.5	-
Average hours per week on voluntary activities (male CHVs)	19.8	18.4	39.0
Average hours per week on voluntary activities (female CHVs)	15.6	14.6	25.7
Average hours per week on voluntary activities (male ETS riders)	36.8	30.0	19.7
Average hours per week on voluntary activities (female ETS riders)	-	31.3	-

Table A 8: Households Served by CHVs

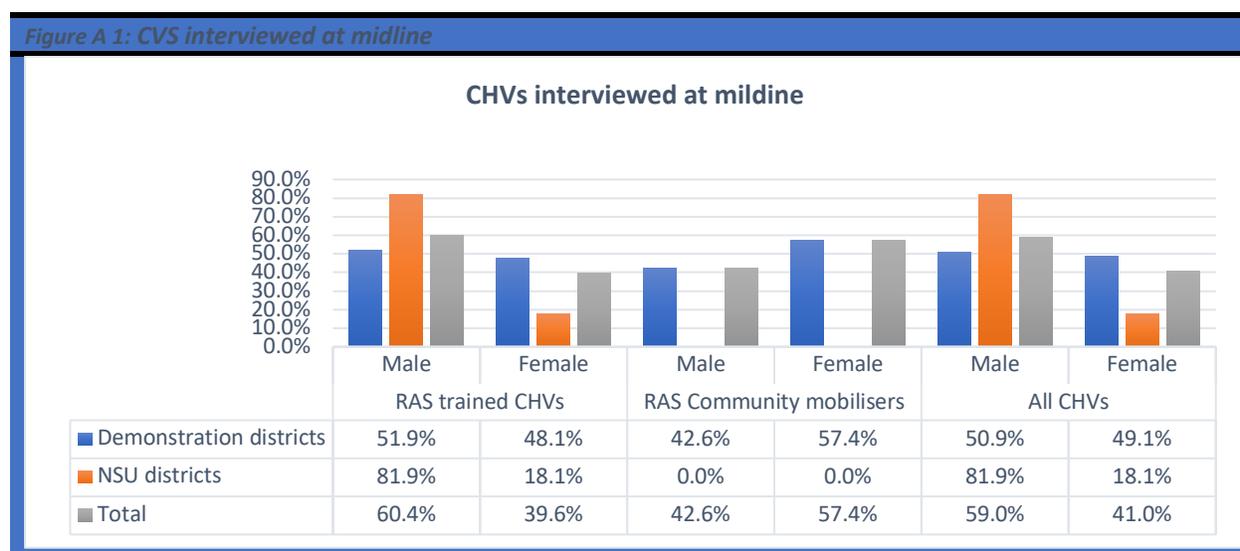
Indicator	Baseline		Midline
	Demonstration districts	Demonstration districts	NSU districts
Average number of households served (CHVs and ETS riders)	216	174	263
Average number of households served (CHVs)	216	171	265
Average number of households served (ETS riders)	209	202	189

²⁴ These results reflect one NSU district (Chama), where three (3) riders were interviewed.

5.3 Annex 2: Socio-demographic Characteristics of CHVs

a) Age and Sex of CHVs and ETS Drivers

Of the 854 CHVs interviewed at Midline 134 were included²⁵ from the analysis in the prior sections. For the 720 CHVs included in the analysis, 59% were males while 41% were females. Considering the demonstration districts (N=532), 50.9% were males whilst 49.1% were female. In the NSU districts (N=188), 81.9% were males whilst 18.1% were females. Comparing the interviewed CHVs at baseline and midline in the demonstration districts more male CHVs (53.6%) were interviewed at baseline than at midline (50.9%), and more female CHVs (49.1%) were seen at midline than at baseline (46.1%). The difference in the proportion of male/female CHVs interviewed at baseline/midline in the demonstration districts was statistically significant ($p < 0.05$).



Overall, in all the visited districts the average of CHVs interviewed was 43.7 years (44.3 years among males' vs 42.8 years among females). Considering the demonstration districts at midline, the average age at Midline was 45.3 years (43.2 years females and 47.2 years males) with oldest CHV being 77 years and the youngest being 19 years. This is slightly different to baseline where the average age was 44.5 years (46.2 years males vs 42.6 years females) with oldest CHV being 81 years and the youngest being also 19 years (like midline). Table A9 below shows the results in detail,

²⁵ These were CHVs who were not trained under the project in the NSU districts. There was no cascading training in NSU districts, so we focus on the RAS trained only

Table A 9: Age distribution

District type	Survey point	Gender	N	Average	Maximum	Mode	Minimum	Standard Deviation
Demonstration districts	Baseline	Male	229	46.2	81	45	21	11.2
		Female	198	42.6	80	40	19	11.5
		Total	427	44.5	81	45	19	11.5
	Midline	Male	271	47.2	77	50	19	10.6
		Female	261	43.2	70	40	20	10.2
		Total	532	45.3	77	48	19	10.6
NSU districts	Midline	Male	154	39.2	67	42	22	9.6
		Female	34	39.8	66	40	23	10.9
		Total	188	39.3	67	40	22	9.9

Comparing the age of CHVs between Demonstration districts and NSU districts at Midline, the results shows that CHVs in NSU districts are significantly ($p < 0.05$) younger than those in demonstration districts (39.3 years vs 45.3 years). Figure A 2 - A3 below shows the age sex structure of the interviewed CHVs from baseline to midline. It can be noted that in both demonstration districts and NSU districts most of the CHVs (male and females) are between the ages 40 – 49 years.



5.4 Annex 3: Tools used during baseline survey

5.4.1 Health Facility Tool

1. District: (Chitambo/Serenje/Vubwi/Chama/Manyinga)
2. Health Facility Name: [only one of 45 possibilities representing the sampled project sites.]
3. Facility ID: [same as the ID used in HMIS database]
4. Type of facility:
 - 1) *District Hospital/Rural Health Centre/Rural Health Post/Urban Clinic*
5. Interviewer ID: [ID number given to the person conducting the interview. Assigned in advance]
6. Date of the Interview:
7. Name of Respondent: [at each facility, the interviewer will seek to speak with the most senior member of staff, usually the Nurse in charge.]
8. Designation of respondent:
9. GPS coordinates: [these will be recorded directly into the tablet gadget]
10. Number of Health facility staff: [all possible responses have been built in for future use even if some may not be used for this survey]
 - a. *Doctors:*
 - b. *Clinical officers:*
 - c. *Nurses:*
 - d. *Environmental Health Technicians*
 - e. *Trainees*
 - f. *Community Health Assistants:*
 - g. *Support Staff/Casual Daily Employee (CDE)*
 - h. *Other:*
11. For the last 12 months (January 2019 to December 2019 for this facility):
 - a. Total number of Malaria cases (adults and children): [Pre-filled from design report.]
 - b. Number of Malaria cases which were children 6months to 1 year: [data for 0-1 years may be readily available, but it may be necessary to estimate for the ages 6months-1 year]
 - c. Number of Malaria cases which were children over 1 year to 5 years:
 - d. Number of **Severe Malaria** cases which were children over 1 year to 5 years: [using the following as the definition of severe malaria: **Child has fever** and one or more of the following: not eating, vomiting everything, fitting, or difficult to wake up.]
 - e. Number of deaths attributed to malaria which were of children 6months to 1 year:
 - f. Number of deaths attributed to malaria which were of children over 1 year to 5 years:
 - g. How are patients with severe malaria treated (with what drug)?
 - h. Number of **Recorded** adverse effects from malaria treatment affecting children 6 months to 1 year: [for any adverse effects, separate information should be recorded, including drug name, dosage given, type of adverse effect, action taken, and treatment outcome.]
 - i. Number of **Recorded** adverse effects to malaria treatment which were children 1 year to 5 years: [for any adverse effects, separate information should be recorded, including drug name, dosage given, type of adverse effect, action taken, and treatment outcome.]

- j. How many cases of severe malaria were referred from the community by CHVs? [use the definition fever/fitting/difficult to wake/ vomiting everything /refusing to eat or drink to check which cases were severe].
- k. How many severe malaria referrals came with a referral form that was completed by a community based volunteer [ask to see the records of referral forms left by volunteers]?
- l. How many severe malaria cases were provided with a completed counter-referral form?
- m. How many severe malaria cases referred by a CHV had been administered RAS?

[to collect this data, the interviewer will allow the staff to compile these statistics from their records- eg HMIS and other registers, then record after confirming the figures].

12. Current stock levels (doses) of the following drugs:

How many units of each drug are available (Adults / Children)?

- 1. SP/FANSIDAR
- 2. QUININE
- 3. COARTEM (Artemether-Lumefantrine (or any other ACT such as ASAQ, DHA-PPQ,))
- 4. Injectable Artesunate
- 5. Rectal Artesunate (excluding that given to CHVs)

13. Are all malaria-trained CHVs in the facility catchment area given ACTs / RDTs / gloves.

14. Have there been stock-outs of these supplies for CHVs in the last 6 months?

15. How many health personnel in this facility have been trained on use of Injectable Artesunate?

- a. When were health workers trained? (month/year)
- b. Who provided the training?
- c. How many staff in this HF attended a training in Inj AS / severe malaria case management?
- d. How many staff received a cascade training in Inj AS / severe malaria case management from another member of the health facility team?
- e. How many staff in this health facility lack the training or experience to deal with severe malaria cases?

16. Have you experienced any disruption in supplies of medicines and other essential consumables due to COVID-19? (

17. Have you suspended or scaled down on community level activities due to COVID-19?

18. Has there been any changes in the volumes of the people seeking the following services due to COVID-19

- a. ANC
- b. Immunisations
- c. Deliveries
- d. Child Health clinics
- e. Growth monitoring

5.4.2 Annex 2: Tool for use with CHVs and ETS Drivers

Identification Information

1. Interviewer ID: [ID number given to the person conducting the interview. Assigned in advance]
2. Respondent ID: [assigned to reflect the facility name and a unique identifier]
3. District: Serenje/Chitambo/Chama/Manyinga/Vubwi
4. Nearest Health Facility Name: [select from list of 45 to be visited]
5. Date of the Interview
6. GPS coordinates (of place of interview)
7. Name of Volunteer:
8. Type of volunteer: [if respondent can be classified as more than one of the options, then select the first suitable option from those below]
 - a. iCCM-Trained CHV
 - b. ETS Driver
 - c. Other Community Health Volunteer

Biodata and personal information

1. Age:
2. Sex:
3. How long have you been a community health volunteer?
5. Number of NHCs served:
6. How many households are in the areas served?
7. What is your highest level of education? (none/primary/secondary/tertiary/other (specify))
8. How many hours in a week do you spend on [ETS/CHV] volunteering activities?
9. Have you ever suffered from Malaria yourself? (yes/no)

Knowledge on Uncomplicated Malaria

11. In your opinion, what causes Malaria? [this question is similar to that used on Malaria Indicator surveys. The enumerator will ask the question and record all the answers provided]
(MOSQUITO BITES/ EATING IMMATURE SUGARCANE/EATING COLD NSHIMA/EATING OTHER DIRTY FOOD/DRINKING DIRTY WATER/GETTING SOAKED WITH RAIN/COLD OR CHANGING WEATHER/WITCHCRAFT/OTHER (SPECIFY)/DON'T KNOW)
12. In your opinion, who is most affected by malaria in your community? (children/adults/pregnant women/elderly/ everyone/other/don't know)
13. What are the main signs and symptoms of simple malaria? [question used in Malaria indicator surveys]
(Fever/Feeling cold/Headaches/Nausea and vomiting/diarrhoea/Dizziness /Loss of appetite /Body aches and pain in the joints/Pale eyes/Salty tasting palms/Body weakness/Refusing to eat/Other (specify))
14. Do you know the signs and symptoms of simple malaria in children? (Yes//No)
 - a) If yes, list all the signs that you know (fever and chills/headaches/nausea and vomiting /general weakness and body aches/fever/other (specify))

Knowledge on Severe Malaria

15. Do you know about the danger signs of **severe malaria** in children? (yes/no)
 - a) If yes, list all the signs that you know (Fever/Unconscious or Lethargic/Not able to drink or eat/Vomits everything/fitting/other (specify))
16. Are you currently involved in identifying children with **severe malaria**? (yes/no)
 - a) If yes, in the last 4 months (120 days), how many children in your NHC have presented with signs of simple malaria?
 - b) If yes, in the last 4 months, how many children in your NHC have presented with signs of **severe malaria**?
 - c) If yes, in the last 4 months, how many children in your NHC with signs of **severe malaria** died?
17. If you are not involved, who currently identifies children with severe malaria at community level? (parents or guardians/ other CHV/ No one / Other)
18. What is usually done for children who show signs of severe malaria? (immediately taken to health facility/taken to health facility if deemed serious/treated with local or traditional medicines/taken to a CHV/ taken to outreach/several of these options/other)

CHVs only

19. Have you ever heard about rectal artesunate? (Yes/No)
20. Have you been trained to administer RAS? (Yes/No)
20. Do you feel confident in administering RAS? (Yes/No)
21. Do you have any challenges in administering RAS? ((Yes/No)
 1. If yes, what challenges do you have in administering RAS?
 2. Have you ever sought help so as to address the challenges? (Yes/No)
22. Have you ever managed a case of a child with suspected malaria? (yes/no)
 - a) If yes, when was the last time you managed the malaria case in a child? (this year/last year/more than two years ago)
 - b) What did you do about the case? (nothing/ I administered drugs only/ I administered drugs and referred child for further treatment/I referred child for treatment)
 - c) What drugs did **you administer**? (SP Fansidar/ Quinine/Coartem-ACT/RAS/ Pain killers- paracetamol or aspirin or ibuprofen/traditional medicine/ other (specify))
 - d) If you referred child for treatment, where did you refer them? (hospital/rural health centre/rural health post/mobile clinic/field worker/another CHV /pharmacy/traditional practitioner/other (specify))
23. Have you ever referred any children with simple malaria or severe malaria to a health facility? (yes/no)
 - a) If yes, what type of written material or form do you use to refer clients with malaria to the health facility (referral form/page from CHV notebook/nothing/other)

- b) What type of written material or form do you get from the health facility after referring clients with malaria to the health facility (counter-referral form/notebook/nothing/other)
 - c) Do you follow up to check on the health of children with severe malaria after they have returned from the health facility? (always/ sometimes / never)
 - d) If you follow up children with severe malaria after they have returned from the health facility how many times on average do you check on them? (once, twice, three times, more than three times)
24. What are the main challenges that you face as a CHV working on malaria?

ETS drivers only (Serenje and Chitambo only)

25. Have you ever transported a child with suspected malaria? (yes/no)
26. If yes, when was the last time you managed the malaria case in a child? (this year/last year/more than two years ago)
27. What is the distance from the central part of your community to the health facility? [recorded in km one way]
28. How long does it take you to reach the health facility when carrying a patient by bicycle ambulance? [recorded in minutes for a one-way journey]
29. How long does it take you to reach the health facility on foot? [recorded in minutes for a one-way journey]
30. What type of written material or form do you get from the health facility after referring clients to the health facility (counter-referral form/page from notebook/nothing/other) [ask to see a sample]
31. Do you think that the community agrees that bicycle ambulances can be used for both maternal and child health emergencies?
32. What are the main challenges that you face as an ETS driver?

COVID-19

33. Have you faced any challenges in doing your work due to measures introduced to curb the spread of coronavirus (COVID-19)? (Yes/No)
34. What are some of the challenges that you have faced?
35. Are parents able to administer RAS to their children under your guidance? (Yes/No)
- a) If no, what measures have you taken to ensure that RAS is eventually administered before referring child to health facility? (Nothing is done / I take all other COVID-19 precautions and administer RAS)
36. Are you confident that you know the main **signs and symptoms of coronavirus (COVID-19)**?
37. If yes, list all the signs that you know (new continuous cough / fever / difficulty breathing / other – specify)
38. Tell us the steps that can be taken to prevent infection with coronavirus (COVID-19):
(wash hands with soap and water frequently / do not touch face with hands / keep a 2 metre distance from people outside your household / cover your coughs and sneezes / do not shake

hands / keep surfaces and personal possessions clean / do not share food, drinks or personal items)

39. Would you say that GBV is rising in your community? (Yes / No)
- a) If yes, would you say that GBV is increasing because of the changes and challenges brought about by coronavirus (COVID-19)?
 - b) If no, would you say that GBV has fallen in your community over the past couple of years? (Yes / no)
 - c) If yes to **(b)**, to what extent has GBV fallen in your community over the past few years? (it has disappeared / it has reduced a lot / it has reduced a little)

Social Inclusion

40. As a female CHV, do you feel that you have a stronger voice at community level as a result of your training? Yes/No (Female CHVs only)
41. Do you think that female community members have more independence to make health and other decisions within their households as a result of the community mobilisation activities in this community (Yes/No)?
42. As a trained volunteer, have you visited the least-supported women in your community in their homes to discuss child health issues? (Yes / No)
43. How many least-supported women in your community have you personally helped on child health issues in the last 4 months?
44. What actions have you taken to support least-supported women in the community?
45. As a trained volunteer, have you taken any action to ensure that the children of the least-supported women in this community are assisted when they are sick with severe malaria? (Yes / No)
46. Please give an example of an action you have taken.
47. As a trained community health volunteer, do you think that fewer children are being delayed in going to the health facility when they are suspected of having malaria? (Yes / No)
48. As a trained community health volunteer, do you think that families in this community are relying less on traditional remedies to treat malaria? (Yes / No)
49. As a trained community health volunteer, do you think that the least-supported women in this community have been reached and included in the child health activities?
50. How many of the least-supported women in this community are being reached with COVID-19 prevention activities? (some / most / all)

END OF QUESTIONNAIRE