THE RESPONDENTS' KNOWLEDGE LEVELS ON MALARIA AND MALARIA CONTROL IN SAMFYA DISTRICT, ZAMBIA.

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ABSTRACT

Collins (2009:430), [1], defined knowledge as "the facts or experiences known by a person or a group of people" [1]. These were acquired, and in most cases benefitted the children, women, men, the community and the country at large. This therefore was the more reason for the study on the people's knowledge levels on malaria and malaria control in Samfya District, Zambia. Random and non-random research designs were used to obtain the sample and data for the study. There were 394 respondents, 3 Focus Group Discussions (FGDs) and 11 key informants.

The resultson the levels of knowledgeon malaria and malaria control was evidenced in the questionnaires and the FGDs. These showed the causes, transmission, treatment and prevention of malaria. The following were identified as the causes of malaria: mosquito (86%), dirty environments (2.5%), dirty water (1.0%), air borne (0.8%), fever (0.5%) and growing crops near homes (0.3%). The transmission of malaria was done through the bite of a mosquito (79.4%), sharing beddings (1.8%), water (1.3%), air (1.0%) and the rest did not know how the disease was transmitted. The treatment seeking behaviours of the respondents were: health care facility (81.5%), CHWs (10.2%), traditional healers (1.3%), drug peddlers (1.3%) and local herbs (5.3%). Those that sought treatment from the health facility or the CHWs were appropriately diagnosed before any drugs were prescribed and dispensed. Depending on the results of the blood test, the patient was either given analgesics or ACT as a first line treatment therapy. The respondents' knowledge on the prevention of malaria was established by assessing various personal protection measures. And these were: burning leaves at night (5.6%), close windows and doors (3.6%), mosquito sprays (3.8%), mosquito coils (4.8%) and mosquito nets (65.5%).

The respondents' levels of knowledge on the causes, transmission, treatment and prevention of malaria varied. On the whole however, there were 64% of the respondents with inadequate and 36% with adequate knowledge on malaria and malaria control. There was a relationshipof the knowledge levels on the causes, transmission, treatment and prevention of malaria and malaria control with the persistent levels of malaria in Samfya District in Zambia.

***Key words**: Causes, Knowledge, Malaria, Prevention, Transmission, Treatment.*

INTRODUCTION

The sound knowledge of community's beliefs and practices about malaria could have helped in the surveillance and control activities [2]. Several research studies had shown that high knowledge about malaria among the communities enabled practices of preventive and control strategies. Despite the high knowledge level about malaria in some Swaziland communities, there was little preferred source of information. Information was obtained from the traditional community district meetings instead of the health sector [2,3]. This meant that several institutions could be used to disseminate information about malaria.

In Sri Lanka the levels of had no positive effects on malaria and malaria control [4]. The community's levels of knowledge were poor, but they were able to associate the insecticide spraying with mosquito reduction and the repellent to other pests in the houses. There was no relationship between the two variables, the levels of knowledge and malaria reduction in Sri Lanka. Aming's (2007), [5], study on Ile-Ife community revealed that even though 75% of the households had fair knowledge and 80%of the households had formal education, only 60% of the households were familiar with the signs and symptoms associated with malaria. The majority of the respondents practised self-prescription and this resulted in poor case management. The various studies done by other scholars showed different results and knowledge levels and malaria.

This article presents and discusses the results on the respondents' knowledge on malaria and malaria control strategies. To address this issue of knowledge, a guided approach on the causes, transmission, treatment and prevention was done.

Statement of the problem

The knowledge was a crucial element in health improvement and the education of a disease burdened group on the ways of prevention and control in disease endemic countries in order to attain self-reliance [6]. The poor knowledge resorted to an individual's inappropriate management and prevention of the disease. This meant that good levels of knowledge had a cardinal role to play in disease management and ultimate eradication. This therefore, saw the need to assess the people's levels of knowledge on malaria and malaria control in Samfya District, Zambia.

Objective

The objective of this study was to assessthe people's levels of knowledge on malaria and malaria control in Samfya District.

THE STUDY AREA

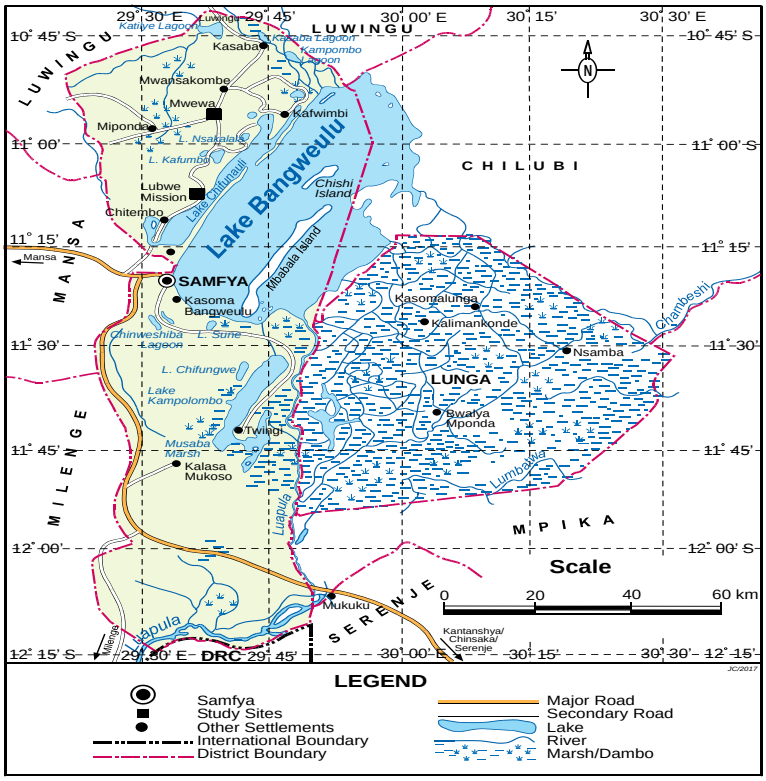

Figure 1: Location of Samfya District

Source: Surveyor General (1979), [7], and Ministry of Local Government and Housing (MLGH 2015), [8].

The study area was Samfya District in the Luapula Province. This area was chosen because other than lying in epidemiological zone 3 of malaria transmission and its ecological nature that provided a geographical gradient, it was also a rural area which experienced various aspects of social developmental inequalities. It was inevitable to assess the levels of knowledge on malaria and malaria control. The study looked at the knowledge levels on the causes, transmission, treatment and prevention on malaria.

Study design and sample size

This was a transect study that was aimed at producing results that would show the geographical gradient of the spatio-temporal distribution of malaria in Samfya District. The employed both qualitative and quantitative techniques in order to ensure more accurate and stronger outcomes. Questionnaires (394 respondents), Interviews (11key informants), Focus Group Discussions (03), records and observations were used to collect the data.

Sampling procedure

Random and non-random sampling procedures were used to select the respondents and the key informants respectively. The Yamane Formulawas used to determine the sample size, the systematic sampling for the selection of the respondents to the sample,and the purposive sampling for the key informants.

RESULTS AND DISCUSSION

The respondents' knowledge on the causes of malaria

In order to establish what the causes of malaria were, the researcher wanted to find out whether the respondents knew what malaria was. The results revealed that eighty-nine point five percent (89.5%) stated that malaria was '*ukumfwa impepo'* (fever), five point eight percent (5.8%) said malaria was 'headache' and nine point four percent (9.4%) of the respondents said malaria was a disease that was caused by a mosquito. This category of respondents went further to state what caused it instead of giving the meaning. The focus groups also unanimously stated that malaria was a disease that was caused by a female mosquito. Some of the responses given actually meant symptoms of malaria such as fever and headache. These were symptoms and not malaria. It could therefore be said that the respondents' perceptions of malaria were linked to the symptoms. Similar studies done elsewhere revealed that malaria was associated with fever and chills, headache, loss of appetite and energy [9].

The causes of malaria were numerous according to the responses obtained from the sample population. These were as shown in Table 1 below:

Table 1: ***The respondents' knowledge of the causes of malaria***

Causes	Frequency	Percent	Cumulative Percent
No response	20	5.1	5.1
Mosquito	339	86.0	91.1
Dirty water	4	1.0	92.1
Dirty environment	10	2.5	94.7
Growing crops near homes	1	0.3	94.9
Fever	2	0.5	95.4
Airborne	3	0.8	96.2
Don't know	15	3.8	100.0

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Airborne	3	0.8	96.2
Don't know	15	3.8	100.0
Total	**394**	**100.0**	

Source: Field data, 2015.

Three point eight percent (3.8 %) of the respondents did not know what caused malaria and 5.1 % did not respond to this question. These responses clearly indicated that the majority (86 %) of the respondents knew the cause of malaria, which was a mosquito. Others stated that 'dirty environment' caused malaria. The explanation obtained from the three focus groups was that 'unkempt surroundings' enhanced the breeding of mosquitoes. Cans, bottle tops, broken bottles, ditches, all these had a possibility of holding some water that allowed mosquitoes to breed. This, therefore, meant that the respondents had to maintain their surroundings clean in order to reduce on the levels of mosquito breeding. Growing crops near homes more especially maize increased the breeding rate of mosquitoes due to the water that collected between the maize stalk and the leaves. Another contributing factor was that the proximity of plants to the houses reduced the flying distance which a mosquito could cover to enter the house and pounce on its prey. Other causes that were stated by the respondents were: 'Fever', 'Air borne' and 'Dirty water'. One wonders how these could be said to cause malaria. Some were not sure as to whether they knew the causes, so they did not respond. These various responses other than that of 'a mosquito' accounted for only 14 % of the respondents.

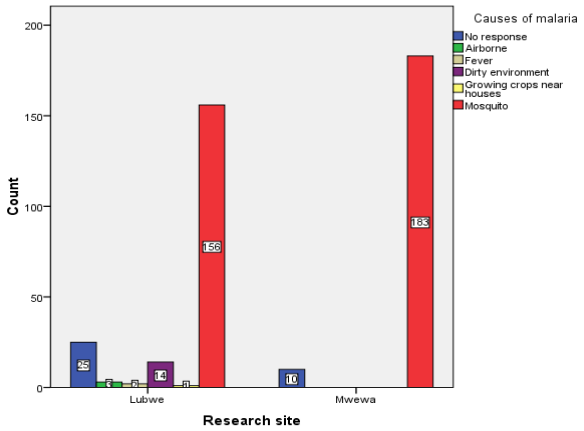

Figure 1: ***The respondents' knowledge on the causes of malaria by site***

Source: Field data, 2015.

A further analysis was done in order to find out whether there was any difference in the knowledge levels on the causes of malaria between the sites according to the responses given. All the respondents in Lubwe identified at least one cause of malaria in all the categories as illustrated in Figure 1, however 156 respondents knew of a mosquito as the major cause of malaria. In Mwewa, the majority (183) of the respondents also knew of a mosquito as the major cause of malaria. When these results were compared to the sample population of 193 and 201 for Mwewa and Lubwe respectively, Mwewa's respondents' were more knowledgeable than those of Lubwe. Comparative results from the whole sample, Lubwe accounted for 39.6% while Mwewa had 46.4% of the respondents who knew that a mosquito caused malaria respectively. Other than the pictorial presentation these differences were confirmed by a Chi-Square test that was done. There were significant differences between the sites and among the causes of malaria. The X^2_{cal} was 30.03 while the X^2_{crt} was 0.49. Table 2 equally shows that there were differences in the respondents' levels of knowledge on the causes of malaria in Samfya District. The differences were within the research sites and between the factors that caused malaria infection. From the sample, 64.0% had inadequate knowledge while 36.0% had adequate knowledge on the causes of malaria. In Mwewa, 59.9% had adequate knowledge compared to 40.1% in Lubwe.

*Table 2:**The respondents' levels of understanding on the causes of malaria***

			Levels of malaria knowledge		
			Inadequate	**Adequate**	**Total**
Research site	Lubwe	Frequency	144	57	**201**
		% within Research site	71.6	28.4	**100.0**
		% within Levels of malaria knowledge	57.1	40.1	**51.0**
		% of Total	36.5	14.5	**51.0**
	Mwewa	Frequency	108	85	**193**
		% within Research site	56.0	44.0	**100.0**
		% within Levels of malaria knowledge	42.9	59.9	**49.0**
		% of Total	27.4	21.6	**49.0**
Total		**Frequency**	**252**	**142**	**394**
		% within Research site	**64.0**	**36.0**	**100.0**
		% within Levels of malaria knowledge	**100.0**	**100.0**	**100.0**
		% of Total	**64.0**	**36.0**	**100.0**

Source: Field data, 2015.

The respondents' knowledge on malaria transmission

The respondents' knowledge on malaria transmission was high in that seventy- nine point four percent (79.4%) knew that malaria was transmitted through a mosquito as shown below:

- Mosquito bite 79.4 %
- Sharing beddings 1.8%
- Water borne disease 1.3 %
- Air borne disease 1.0 %
- I don't know 5.8 %

Source: Field data, 2015.

The respondents that knew about the mosquito as the mode of malaria transmission in this study were more (79.4 %) than those in the study done by [9], that revealed a 32.3 % of the respondents. Other respondents mentioned factors like 'corn cane', 'drinking dirty water' and 'sleeping with malaria patients' (sharing the bed with malaria infected people) to be the transmitters of malaria. The responses about the 'corn cane' and 'sleeping with malaria patient' were similar to those obtained in this study from interviews and FGDs. These people stated '*ukulya ifisali no kulala pamo nomulwele wa malaria kutiwayambulaubulwele'* (eating sugar cane and sharing a bed with a malaria patient you can get infected). The 'eating of the sugar was associated with the irrigation method of growing the cane which also provided breeding ground for the mosquitoes. While the latter was true in a way in that it was easy for the mosquito, the main transmission agent to draw blood from an infected person, ingested the parasites which were later injected into another person. This initiated a vicious cycle in a home. Some respondents attributed the occurrence of malaria to the household size. They stated that in homes where there were many members, there was always malaria. Even though certain factors were mentioned, these were not direct transmitters of malaria.

Some respondents did not know how malaria was transmitted. Of those that knew, some went further to state how malaria was transmitted. The results from the focus group discussion revealed that transmission of malaria was through a mosquito that had bitten an infected person and then deposited the infected blood into another person. They identified the mosquito as the female anopheles mosquito. The reasons why they thought the female mosquito was the transmission agent was that '*utwanakashitwabulili'* (females were gluttons) and '*umulanduwamanitwakwataayafwaya umulopa'* (because of the eggs they carried that required a blood meal). On the issue of eggs this could have implied the parasites that required the blood meal for survival; and the sexual and asexual reproductive regimes of a mosquito.

The respondents' knowledge on the transmission of malaria revealed that seventy-nine point four percent (79.4%) knew that a mosquito was the transmission agent, five point eight percent (5.8%) did not know while one point three percent (1.3%) said malaria was water borne and air borne respectively. The disease however, was a vector borne just like Dengue, Filaria (Elephantiasis), Chikungunya, Zika, Yellow fever, Dog heartworm and West Nile vine [10]. All these diseases were transmitted by different species of mosquitoes. The level of knowledge on how malaria was transmitted was quite high (79.4%) for the whole sample population. There were variations between the two sample sites. Mwewa had 91.2 % a much higher percentage of the respondents that knew that a mosquito was a malaria transmission agent than the 68.2 % Lubwe had.

The Chi-square (X^2) results confirmed this disparity in the responses for both the whole sample and in between the sites. The results showed an asymptomatic significance. The $X^2_{cal}$was 42.627 while the X^2_{crit} was 1.96 an indication that there was a significant difference in the respondents' level of knowledge on malaria transmission. .

The various responses which are indicated in Figure 2 show that the responses from Lubwe spread over six (6) categories while those of Mwewa only spread over three categories of which three

were 'mosquito bite', 'I don't know' and 'no response'. The outcome of the responses on the knowledge on the transmission of malaria were similar to those of the causes of malaria. Mwewa's respondents appeared to have higher levels of knowledge on the cause and transmission of malaria than Lubwe even though they did not attribute these to any other factors as Lubwe respondents did where the respondents had alternative responses.

The numbers indicated in Figure 2 portrayed the figures of those that knew how malaria was transmitted and of 183 respondents that knew the causes of malaria in Mwewa, only 176 knew that it was transmitted by a mosquito. In Lubwe, of the 156 that knew the causes only 137 knew that the transmission agent was a mosquito. The respondents' levels of knowledge on the causes and transmission of malaria were still higher in Mwewa than Lubwe. Figure 3 illustrates that the population in Mwewa was better off in terms of the levels of knowledge on the transmission of malaria. The respondents with 'adequate' and 'inadequate' were inversely related to the respondents' levels of knowledge in Lubwe. This meant that the levels of knowledge on malaria transmission in Mwewa were higher than those of Lubwe.

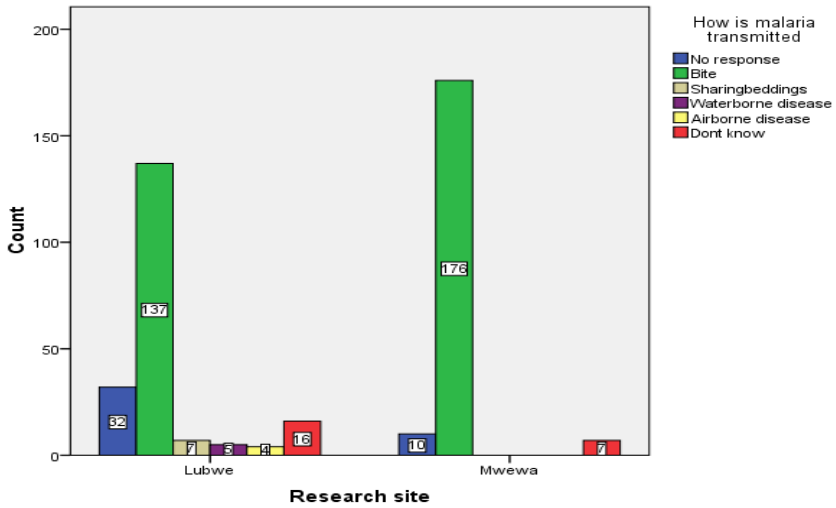

Figure 2: ***Respondents' knowledge of malaria transmission by sites***

Source: Field data, 2015.

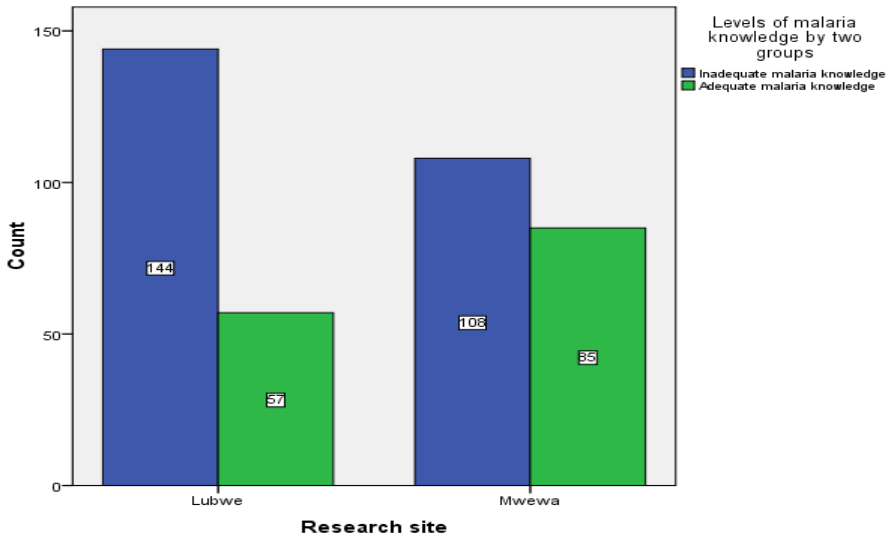

Figure 3: ***Respondents' levels of knowledge on malaria transmission by site***
Source: Field data, 2015

The respondents' knowledge of malaria treatment

Malaria treatment was determined by the manifestation of various symptoms that were later followed up by diagnosis through a blood smear test. This, however, did not apply to all the people that had malaria as some prescribed their own medication which they purchased from open shelf drug stores and peddlers, or begged from neighbours; some took herbs while others did nothing about it. This part therefore, discusses the malaria symptom, treatment seeking behaviours and malaria treatment.

Table 3: ***The respondents' knowledge of common malaria symptoms***

Symptoms	Frequency	Percent	Cumulative Percent
Diarrhoea	3	0.8	0.8
Vomiting	12	3.0	3.8
Body pains	12	3.0	6.9
Headache	9	2.3	9.1
Fever	128	32.5	41.6
Fever, body pains, vomiting, diarrhoea and headache	230	58.4	100.0
Total	**394**	**100.0**	

Source: Field data, 2015.

Table 3 shows that 58.4 % cited fever, body pains, vomiting, diarrhoea and headache as the main symptoms of malaria. Thirty-two point five percent stated fever as the most common symptom while vomiting and body pains had 3.0 % each, and diarrhoea was the least cited. The studies by other scholars had also indicated that fever and chills were associated with malaria. In most cases those that presented with this symptom, diagnosis showed the presence of parastaemia in their bodies. That is how fever was associated with malaria because of circumstantial presence of parastaemia.

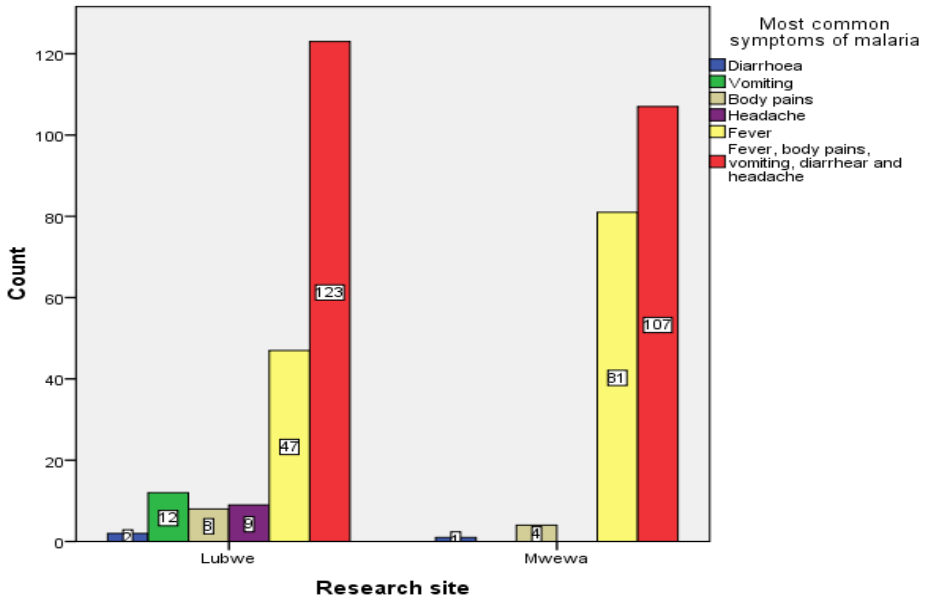

Figure 4: **The respondents' knowledge of common malaria symptoms**

Source: *Field data, 2015.*

Figure 4 shows the respondents' knowledge of the malaria symptoms according to the study sites. A combination of fever, body pains, vomiting, headache and diarrhoea were cited to be the most common by sixty-one point two percent (61.2%) and fifty-five point four percent (55.4%) of the respondents from Lubwe and Mwewa respectively. The whole sample had a fifty-eight point four percent (58.4%) who stated that a combination of symptoms were responsible for malaria manifestation. The fever, body pains and headache were crude ways of telling that one had malaria because a number of ailments had similar symptoms of fever, headache and body pains for example influenza (flu) or common cold and tonsillitis. This therefore warranted thorough diagnosis before any drug dispensation was done. Once these symptoms manifested, the respondents sought treatment from various sources as shown in Table 4.

Table 4: ***The respondents' health seeking behaviour***

Seeking behaviour	Frequency	Percent	Cumulative Percent
Health centre/clinic	321	81.5	81.5
Community health worker	40	10.2	91.6
Traditional healer	5	1.3	92.9
Drug store/pharmacy	5	1.3	94.2
Local herbs	21	5.3	99.5
No where	2	0.5	100.0
Total	**394**	**100.0**	

Source: Field data, 2015.

Table 4 illustrates that eighty-one point five percent (81.5%) of the respondents sought treatment from a health facility where they said proper diagnosis was done to them. Blood samples were used to determine the presence of parastaemia in the body after which appropriate medication was administered to the patient. Those that were diagnosed negative were treated according to the presentation of the symptoms and in most cases analgesics were prescribed. The patients that did not afford to go to the hospital were attended to by the CHWs who lived within their communities. The CHWs were trained personnel on how to handle malaria cases through the use of rapid diagnostic test (RDT). For those that had parastaemia, treatment commenced immediately. The CHWs made follow up visits in order to monitor how the patient was recuperating. The work done by CHWs was on voluntary basis. At the start of the engagement of the CHWs, malaria control had improved but at the time of the survey, management of cases was a challenge due to decreased numbers of the CHWs. The numbers went down due to lack of remuneration as the work was becoming more taxing and stressful because of long distances the CHWs had to cover within their communities. Another challenge the CHWs faced was that of the drug stock outs. They sometimes referred the patients to the hospital which was equally far for many respondents more especially those that had no bicycles as their main mode of transport. This therefore forced some not to seek medical care thereby perpetuating the disease incidence as they resorted to other alternatives. The focus groups revealed that the CHWs were doing commendable work in their communities even though they were overwhelmed. The discussants further suggested more recruitments and that the government should think of remunerating these volunteers and also address the mobility and drug stock outs issues for care givers in the primary health care delivery. These could strengthen case reporting, treatment and monitoring of patients.

Malaria rapid diagnostic tests (RDTs) assisted in the diagnosis of malaria by detecting evidence of malaria parasites (antigen) in human blood. Rapid Diagnostic Tests which permitted a reliable detection of malaria infections even in remote areas with limited access to good quality

microscopy services were not readily provided [11], as the case of Samfya District. Malaria RDTs detected specific antigens produced by malaria parasites and could detect only one species such as Plasmodium falciparum while those done elsewhere in the world detected multiple species (Pvc, Pvw, Pm Pk and Po). The blood for the test was obtained from a finger prick.

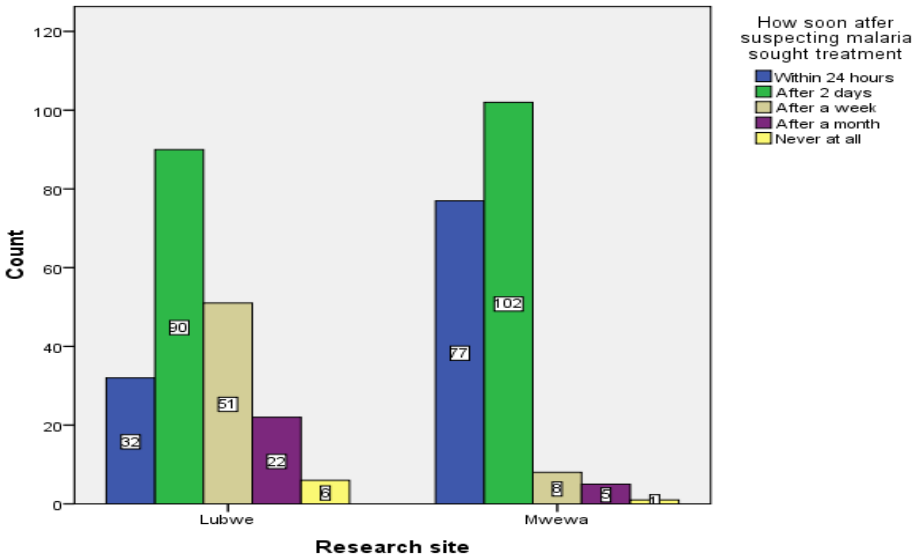

Figure 5: ***The respondents' health seeking behaviour according to sites***
Source: Field data, 2015.

After manifestation of any of the symptoms already mentioned, the patients had different health seeking behaviours. Twenty-seven point seven percent (27.7%) sought medical attention within 24hours while forty-eight point seven percent (48.7 %) went to a health facility after 2days (48 hours), fifteen percent 15%) went after one week (7days), six point nine percent (6.9%) sought medical attention after a month (30 days) and some never sought any treatment at all. Malaria as a disease required quick attention before it translated into severe malaria, meningitis, febrile malaria or sequelae.

The respondents' malaria treatment seeking behaviours

The treatment coverage had been assessed across Africa, but understanding the low access to treatment varied throughout the malaria endemic world. The evaluation of the true public health impact during the transmission from the control of clinical disease towards regional focuses on malaria elimination and the post 2015 was essential (Battle et al. 2015). The year 2015 was used as a bench mark for the achievement of the various targets on the MDGs. There has since been a shift from MDGs to the Sustainable Development Goals (SDGs). The MDGs were only 8 and the current SDGs were 17. The malaria targets were not 100% achieved, therefore the shift in the period of achievement to 2030 was hoped to attain the goals and targets.

It was necessary therefore, for this study to establish whether the respondents had suffered from malaria in the last 6 months, where and how soon they sought treatment, whether they had enough

information they desired to have and how they wanted it communicated to them. Figure 6 illustrates whether the respondents had suffered from malaria in the last 6 months.

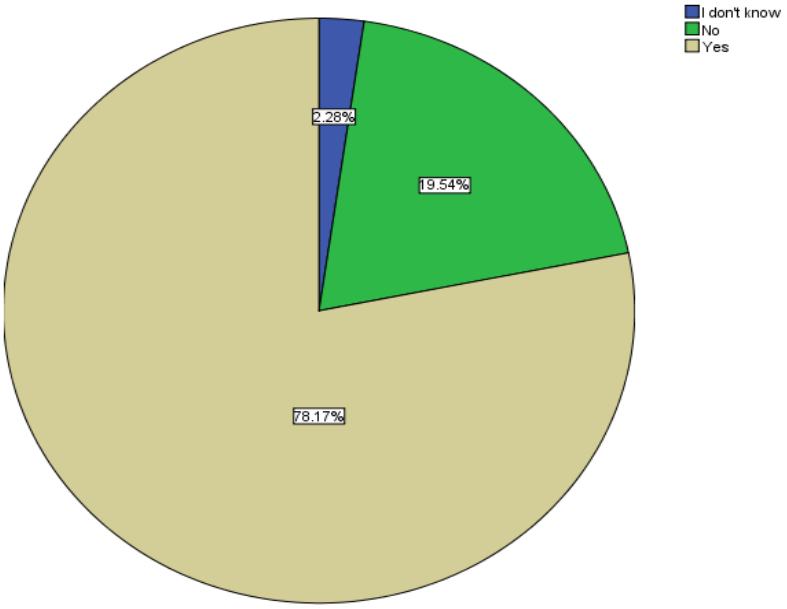

*Figure 6: S**uffered from malaria in the last 6 months***

Source: Field data, 2015.

Figure 6 showed that 78.2% of the respondents had suffered from malaria infection in the last six (6) months while only 19.5% of the respondents said they had not. The remaining 2.3% did not know whether or not they had suffered any malaria infection. They thought that the symptoms they had, had nothing to do with the disease. They regarded fever or headache as ordinary illnesses and not associated with malaria. For example some respondents stated that they did not go to the hospital to seek treatment but instead they conducted a 'sauna' by boiling leaves to steam themselves, *(inenshiyakuchipatala, njipikafyeifimabulaelyonayinatwila / ukufutikila).*

Some of those that were sick sought treatment from different sources as indicated in Figure 7 below.

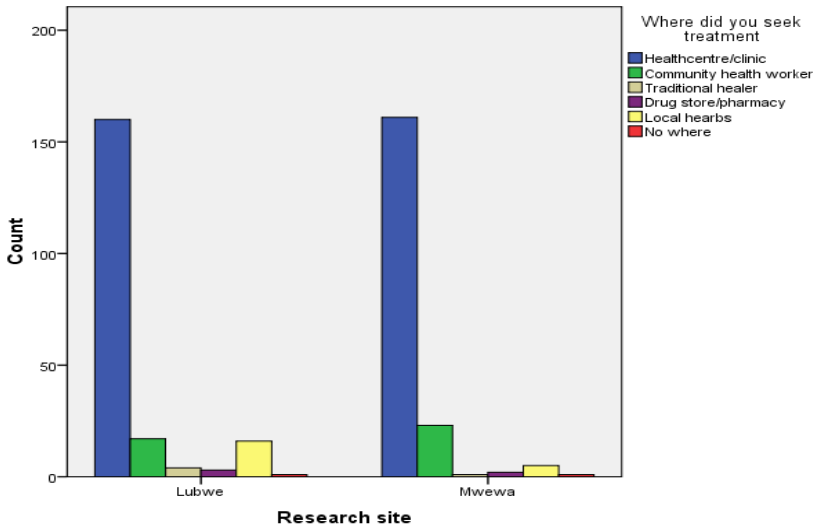

Figure 7: ***The respondents' sources of malaria treatment***

Source: Field data, 2015.

Two hundred and fifty-one (251) out of a total of 308 sought treatment from a health facility representing 81.5% of the total number of the respondents that fell ill the last 6 months before the survey. Another 10.2% of the respondents were attended to by CHWs. The CHWs were members of the community that had undergone training in order to facilitate the rapid case diagnosis using RDTs and treatment of malaria. This helped with case reporting and management of malaria within the communities. The only challenge the CHWs faced was drug stock outs and as a result patients were referred to the hospital which was quite far. This compromised the health of the respondents and their families.

Some respondents used local herbs and herbs from traditional healers. The local herbs were those identified or known by an individual or community like '*Lwena*' (a Vicks plant), to cure certain ailments without consulting a herbalist or a traditional healer. For instance, for the treatment of fever or headache, a sauna was recommended. They used eucalyptus leaves, '*Lwena*' plant (a Vicks plant) or any fruit tree leaves that would help conserve the heat in the water for about 10-15 minutes. This was intermittently done in order to get breath and to avoid suffocation. The respondents that went for prayers constituted only 0.5%. Even though the figure was insignificant, these people acted as reservoirs for parastemia for the perpetuity of malaria infection.

One point three percent (1.3%) got drugs from unlicensed drug stores in the market place. These were being called unlicensed drug store dealers because they did not display any legal document to show authority or permission to conduct such business, some drugs were peddled and sold to unsuspecting customers and patients who were fond of self-prescription. The most common drugs that were sold were analgesics and antimalarial. The SP was the drug sold for the treatment of malaria and it cost K4.50. This was combined with the paracetamol which was also sold at K2.00 and this gave a total cost of K6.50 for the whole course of malaria according to the drug peddler. Since the drug used in the ACT, the AL (Coartem) was expensive and could not be afforded and at

the same time was not good for business, so these drug peddlers and store owners capitalized on the sale of SP that was cheaper but regarded as a prophylactic drug by the health fraternity (interview a drug peddler, 08/09/2015). The SP was being abused and so did not positively impact on the control of malaria. There was need for health information in order for the residents not to abuse drugs by misapplication.

Information flow about malaria was a challenge as only 36.3% acknowledged to have adequate information while 59.4% did not have the information and, 4.3% were not sure about the information they had received. Information could have enhanced knowledge on a phenomenon and in this case malaria. The respondents indicated that they required information in the various aspects of malaria such as on the occurrence, transmission, control and prevention only or on all the four aspects as shown in Table 5.

*Table 5:**Malaria information required by the respondents***

Malaria information required	**Frequency**	**Percentage**
Occurrence	49	**12.4**
Transmission	37	**9.4**
Control	57	**15.5**
Prevention	96	**24.4**
Occurrence, transmission, control and prevention	125	**31.7**
No response	30	**7.6**
Total	**394**	**100.0**

Source: Field data, 2015.

The information the respondents required most was on occurrence, transmission, control and prevention of malaria. Thirty-one point seven percent (31.7%) required information in all the four aspects of malaria in order to enhance their knowledge levels. Twenty-four point four percent (24.4%) required information on the prevention of malaria while 15.5% on control, 12.4% on occurrence and 9.4% on the transmission of malaria. The respondents that required information on all the aspects and prevention only were 56.1% that is more than any other categories as indicated below:

- O T C and P + O = 44.1%
- O T C and P + T = 41.1%
- O T C and P + C = 47.2%
- O T C and P + P = 56.1%

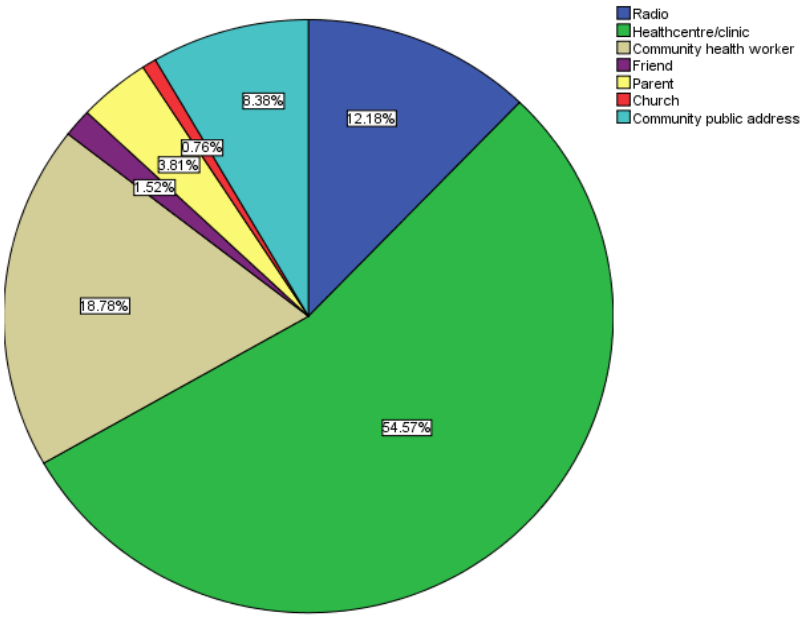

Figure 8: ***The respondents' source of information about malaria***

Source: Field data, 2015.

The whole sample lacked adequate knowledge on malaria and malaria control. This did not only impact on the health seeking behaviour but also on malaria treatment and ultimately the control of malaria. Malaria was a treatable disease and while effective therapies existed, population health seeking behaviours limited the extent to which they were utilized. Information regarding the treatment seeking behaviours of fever cases was essential to assessing the feasibility and success of malaria control and elimination programmes. The study by Battle et al. (2016), [12], revealed similar results about the population's treatment seeking behaviours.

The treatment of malaria had evolved over time. Chloroquine (CQ) was once the main treatment drug before its efficacy declined. It was then replaced by SP whose potency also declined. The decline was manifested through the parasites that became drug resistance and exposed the population to clinical malaria. This enhanced the morbidity and mortality rates. Yeung et al. (2004), [13], argued that CQ and SP were becoming increasingly ineffective throughout the world and therefore, advocated for the use of ACT. According to Ogouyemi-Hounto (2016), [14], WHO recommended the use of ACT for treatment of uncomplicated falciparum malaria in countries where the rates of CQ/SP drug resistance were high. Artemisinin combination therapy was therefore widely promoted as a strategy to counteract the increasing resistance of Pf to anti-malarial drugs, and to prevent disease transmission through their action against gametocytes. According to Kuehn and Pradel (2010), [15], gametocytes were male and female cells that were produced during the sexual stage of the malaria parasite in the blood of a human host. Wikipedia (2007), [16], stated that when a mosquito ingested the blood from the human host it comprised a male (microgametocyte) or female (macrogametocyte) gametocyte which underwent further

reproduction ([16], retrieved on 16.05.2016). This was what constituted the asexual and sexual processes of reproduction.

In Samfya District, ACT was used as the first-line treatment therapy for malaria and provided life-saving benefits to children, adults and pregnant women. In which the use of Artemether-Lumefantrine (AL, Coartem)was earlier advocated as the only registered drug for ACT then. Later Dehydroarte-misin-piperaquine (DP- Artekin) was found safe and is also used. Other drugs that were/are used in the treatment of malaria were Quinine both oral and intra-venus (IV), Lumet and Artesunate (only injectable). The doses varied according to the ages and weights of the peadiatric and adult patients. When there were drug stock outs, the drugs could be used interchangeably. The children could be given drugs that were meant for adults by approximating the dose and vice versa. This compromised the proper treatment of malaria and made patients vulnerable to clinical malaria.

The respondents' knowledge on malaria prevention and control.

Malaria prevention was an action that barred mosquitoes from transmitting the parasites to the population while control was the deterrent to mosquito multiplication in their populations. This part, therefore, discusses the knowledge of malaria in Samfya District. These were simultaneously discussed. The respondents' knowledge on the prevention measures was varied as shown in Table 6.

Table 6: ***The respondents' knowledge on ways of malaria prevention***

Ways of prevention	Frequency	Percent
Don't know	30	**7.6**
Going to hospital/clinic	14	**3.6**
Close windows	26	**6.6**
Wear thick clothing	39	**9.9**
Spraying the house	29	**7.4**
Use ITNs	256	**65.0**
Total	**394**	**100.0**

Source: Field data, 2015

Sixty-five percent of the respondents cited the use of ITNs as one way malaria could be prevented, nine point nine percent (9.9%) stated that wearing of thick clothing prevented malaria infection, seven point four percent (7.4%) said by spraying the house, five point six percent (5.6%) said by cleaning the surrounding and other respondents did not either know the prevention ways or resorted to go to the hospital (7.6% and 3.6% respectively). Only one percent (1.0%) stated that

closing the windows prevented malaria infection. These were community prevention strategies for the whole sample. The trends in these responses however were not different from those of the two sites. The differences were between the ways in which malaria was prevented as the X^2 test showed.

There was a significant difference amongst the responses given. The X^2 test revealed that $X^2_{cal}$was 48.379 at 6 df and the X^2_{crit} was 1.9. This result confirmed that there was a significant difference in the ways of preventing malaria in the sample area. The highest percentage was 65.0 % for use of ITNs and the lowest 1.0% for those that closed the windows. All the other ways of prevention of malaria by the respondents constituted less than 40.0%.

Other than the community malaria prevention measures there were also personal and household prevention measures such as the use of mosquito coils, mosquito sprays, mosquito nets, burning of leaves, and closing windows early as Table 7 illustrates.

There were some respondents who stated that malaria could not be prevented because the various measures and strategies that were in place were not strictly adhered to.

Table 7: ***The respondents' personal malaria protection measures***

Personal protection measures	Frequency	Percent
Nothing	66	16.8
Burning leaves at night	22	5.6
Close windows and doors	14	3.6
Mosquito sprays	15	3.8
Mosquito coils	19	4.8
Mosquito nets	258	65.5
Total	**394**	**100.0**

Source: Field data, 2015

Table 7 shows that there were several personal protection measures against malaria that the respondents used. Sixty-five point five used mosquito nets, 16.8% never used anything, and 5.6% burnt leaves in the evening in order to chase the mosquitoes. This increased the mosquito nuisance outside and made the respondents more vulnerable to mosquito bites. Four point eight percent (4.8%) used mosquito coils which they said were reactive to some household members due to their pungent smell. Besides this, it was costly and quite unsustainable to maintain. The other respondents (3.8%) used mosquito sprays. Only 3.6% of the respondents stated that they 'closed

windows and doors'. The FGDs revealed similar results. On closing windows and doors, the discussants said that these were closed as early as 17:00 hours (GMT 15:00 hours) for they believed that mosquitoes entered the houses in the early evenings *(tulesala bwangu insolokoto lilya fye akasuba kalemba pakutila ba mung'wing'wi beyingila mung'anda).*

CONCLUSION

The community had knowledge on occurrence, transmission, treatment and prevention. The respondents knew what caused malaria and identified a female anopheles mosquito as the main vector that caused malaria and transmitted it. The transmission was through the blood from an infected person to another. An infected person with parasitaemia presented various symptoms which were assumed to be malaria. Fever was spotted to be the main cause of Malaria even though it was associated with the other ailments such as tonsillitis or influenza.

This therefore, required proper diagnosis by the use of RDT, Molecular Analysis or Microscopy Diagnosis depending on the capacity of the health facility and /or community. Depending on the presence or absence of parasitaemia anti-malarials or analgesics were prescribed and dispensed. Artemisinin Combination Therapy (ACT) was used as first line treatment for malaria in Samfya with the use of Coartem (AL) while SP (Fansidar) was used as a prophylaxis in pregnant women.

Malaria was prevented by the use of mosquito nets, mosquito coils, burning of leaves, mosquito sprays, closing of windows and doors, and others did nothing about it. The methods determined the mosquito populations in the area. Mismanagement in the strategies enhanced the resistance in the vectors which also increased their nuisance.

Even though the respondents had knowledge on the occurrence, transmission, treatment and prevention, 36.0% had adequate knowledge while 64.0% had inadequate knowledge levels. This meant that the respondents did not really understand the issues of malaria that was why the burnt leaves for protection, wore long clothes, bought malaria drugs off the shelf or never did anything whenever they fell ill.

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