

Community health workers' perceptions of barriers to utilisation of malaria interventions in Lilongwe, Malawi: A qualitative study

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Abstract

Background. In line with increased advocacy for implementation of malaria interventions at community level, universal net coverage has become a prominent intervention in Lilongwe, Malawi. However, beliefs and perceptions about malaria interventions have greatly affected the implementation of interventions at community level. This study explored the perception of community health workers in Lilongwe on barriers to effective malaria control service delivery and utilisation at the community level.

Methods. Data on perceived beliefs and misconception about malaria interventions were collected through qualitative interviews. Qualitative data were analysed using the Framework Analysis approach.

Results. The study identified a number of factors that health workers cited as barriers and challenges to effective implementation of malaria interventions in Lilongwe. These related to health workers' assimilation of community's beliefs and traditions; beliefs about causes of malaria contrary to known biomedical causes of malaria; beliefs about traditional methods of malaria prevention and treatment; beliefs about insecticide-treated nets (ITNs) as a cause of infertility among married couples; beliefs about alternative uses of ITNs; and lack of understanding about selective susceptibility to malaria infections.

Conclusion. This study demonstrated, in part, that beliefs and perceptions about malaria intervention evolved through ecological correlations and requires education that fully explains how such correlations arose other than simple disproof as myths. A participatory approach in designing and delivering malaria interventions at community level complemented with the inclusion of traditional interventions results in better collaboration and is more likely to be accepted by members of the community as it provides cultural synthesis.

1 Introduction

In Malawi, just like other parts of sub-Saharan Africa, malaria remains one of the major public health problems affecting children under the age of five and pregnant women. Recent estimates indicate that suspected malaria cases have almost doubled from about 3.7 million cases in 2005 to 6.1 million cases in 2009. Children under the age of five constituted almost 50% of all suspected malaria cases. Annually, malaria contributes at least 34% of all outpatient visits and 40% of all hospital deaths in the country. Malaria is also responsible for about 40% of all hospitalisation of children under the age of five [1,2]. It was estimated that 40% of deaths in children under the age of two in the country were due to malaria [3]. Malaria also accounts for 21-44% of the resources used in health care, 1-3% losses of productive workdays in the private sector, and other indirect losses in productivity, because adults may be either ill themselves or taking care of ill children. This may result in forfeit of wages, other earnings, or valuable time in subsistence farming on which the majority of the Malawian population depends [4].

In order to minimise the burden of malaria, the Government of Malawi is currently implementing a number of interventions at community level. These interventions include, but are not limited to, insecticide-treated bednets (ITNs), intermittent preventive treatment (IPT) and environmental management. These interventions prevent mosquito bites to avoid infection with, or transmission of, parasites to/from humans, or clear parasites from blood circulation to prevent disease and/or prolonged infection. Environmental management targets mosquito breeding sites in order to reduce vector densities. Under controlled settings, the current malaria interventions have been proven to effectively reduce malaria morbidity and mortality between 19% and 95% [5-9] depending on the mode of prevention and control and the intensity at which these are implemented. Despite this scientifically proven effectiveness successful implementation has remained a challenge in many African countries including Malawi. These implementation challenges may have arisen, in part, due to beliefs and misconceptions about malaria interventions.

Understanding people's perceptions and beliefs about malaria causation and spread as well as available interven-

tions is a critical element in successful planning and implementation of interventions. Given the increased impact of malaria on mortality and morbidity and increased funding targeting malaria interventions in Malawi, this study explored the barriers that hinder effective intervention delivery and utilisation at the community level in Lilongwe, Malawi and how these can be addressed to minimise the burden of malaria. This study explored the perception of community health workers, involved in the delivery of malaria interventions in Lilongwe, with regard to effective malaria control service delivery and utilisation at the community level.

2 Methods

2.1 Study area

The study was conducted in Lilongwe district. Lilongwe district is the capital city of Malawi with a population of about 1,897,167 [10], accounting for 15% of the country's total population. Out of all the 28 districts in Malawi, Lilongwe has the highest predicted risk of malaria in children under the age of ten and has a prevalence of 59% (95% CI 43% - 75%) [11], which is the third highest in the country. This suggests that there is high need for malaria interventions in the district. Lilongwe was also chosen because it is one of the two pilot districts for the implementation of intermittent preventive malaria treatment in infants (IPTi). Unlike in other districts, all health workers in Lilongwe underwent training in IPTi, which included a refresher programme on malaria prevention and control. As a result of this training, it is therefore assumed that they have more knowledge about malaria interventions in Malawi.

2.2 Study participants

This study explored the beliefs and perceptions of Health Surveillance Assistants (HSAs) and Assistant Environmental Health Officers (AEHOs). HSAs are community-based health workers employed to work full time in the community they live in. The Malawi Ministry of Health (MOH) employs HSAs and each has responsibility for about 2000 people. The HSAs are trained for 8 weeks and their job description includes, amongst other duties, disease surveillance and health education on the importance and proper utilisation of malaria interventions [12]. The job description of AEHOs includes water and food safety and hygiene, occupational health and safety, communicable disease control, and environmental protection. The MOH employs AEHOs to work as supervisors of HSAs [13] and are involved in educating and supporting Malawians to safeguard, improve and maintain high standards of environmental health in order to avoid diseases like malaria that could arise due to poor environmental health [14]. The fieldworkers (HSAs

and AEHOs) were selected because they are the implementers of malaria prevention and control programmes at community level in Malawi and therefore their reported views were presumed to emanate from their own field experience.

2.3 Sample selection

Purposive sampling was used to select potential participants for qualitative inquiry. Focal health workers, which were actively involved in the IPTi pilot-implementation project between 2008 and 2009, were drawn from 6 health facilities in Lilongwe district including the district health office in Lilongwe. Few study objectives were set due to a limited study period and as a result saturation of ideas was reached after having interviewed 6 community health workers; this allowed us to analyse a small sample size. To triangulate the response from community health workers, 2 policy makers from the National Malaria Control Programme and from funding agencies supporting malaria control in Malawi were also invited for the interviews.

2.4 Qualitative interviews

The corresponding author, who has considerable experience in malaria research in Malawi and completed training in the planning and execution of qualitative enquiries, conducted the semi-structured interviews. All interviews were conducted with health workers in Lilongwe between June and August 2010. No sequenced set of questions was prepared but rather sub-topics or headings of interest with a limited set of questions under each heading that served as a memory aid. This was intentional and allowed for a more in-depth and flexible approach to the discussions with the ease of posing follow up questions whenever salient points were raised by the interviewee. Additional clarification and probing for more details were sought whenever deemed necessary. This in-depth probing for details and uncovering of new ideas not previously anticipated at the outset of the interview, as recommended by other researchers [15], helped to explore the actual meanings intended by the interviewee and consequently, explored people's beliefs and perceptions (both health workers and communities using interventions) that impede effective malaria control and prevention in Lilongwe.

2.5 Confidentiality and informed consent

All data collected from the qualitative enquiry were treated as confidential. The interviews (conducted in English) were recorded and transcribed immediately afterwards. The transcriptions did not contain names of individual interviewees and the recordings were deleted after transcription. Fictitious names are used in the results section below. Potential

research subjects were requested for their voluntary participation for the interviews and they were encouraged to withdraw at any time if they felt uncomfortable with the interview.

2.6 Ethical approval

Ethical approval was granted from the University of Edinburgh, School of Health in Social Science Research Ethics Committee.

2.7 Data analysis

The data collected from qualitative interviews was analysed inductively and followed a thematic analysis approach to identify, analyse and report main themes. The transcripts were coded as the themes emerged from the data [16] drawing on the Framework Analysis approach [17]. Because the main themes (*a priori* concepts) were already developed based on studies from other countries, the Framework Analysis was considered more appropriate.

3 Results

3.1 Participants' backgrounds and their roles in the community

Six community health workers and one policy maker were interviewed and details about their background and professional experience are shown in Table 1. The participants included were pooled from a gendered cross section with varying years of professional training and work experience. All participants had the minimum academic qualification of Malawi School Certificate of Education (MSCE) equivalent to GCE "O" level in the UK. Attainment of MSCE entails that one has undergone a minimum of 12 years schooling (8 years primary and 4 years secondary education).

As reported by the participants, AEHOs had similar roles to HSAs but at a supervisory level. However, AEHOs also work directly with the communities just like HSAs. Both cadres have a lot of roles to play in prevention and control of diseases of local importance. As for malaria prevention and control, they described their roles as follows:

Asante (AEHO): My main role is to sensitise the community on the dangers of malaria and advise them what to do in order to prevent malaria infection. And also to advise people where to go with malaria-infected patients.

Chaona (HSA): My job as HSA; I mainly work in the community on issues pertaining to health, especially in preventive health. Also on alerting people on some other communicable diseases like malaria, diarrhoea, cholera

and the like; in educating them on how to prevent or protect oneself from contracting these diseases in the community. So I stay in the community and work there.

Although AEHOs and HSAs have differing job descriptions, their roles in malaria prevention and control at community level were thus considered identical. Raising awareness on the dangers of malaria and advising on preventive measures were the prominent roles described by the participants. All this may be summarised as health education and health promotion on the causes of malaria, dangers of the infection and how to implement malaria interventions at the community level.

3.2 Participants' understanding of causes of malaria and treatment

3.2.1 Health workers' knowledge about the causes of malaria

The participants demonstrated adequate knowledge about the cause of malaria and how the disease is transmitted from one person to another. Afana, who underwent HSA training in which malaria prevention and control formed part of the curriculum, vividly remembered the causes of malaria from his biology lessons learnt in school.

Afana: My understanding is based on what we learnt in MSCE biology; malaria is caused by a parasite, which invades red blood cells. The parasites feed on these cells, burst them causing fever and anaemia. The parasites are carried by mosquitoes and if you are bitten, mosquitoes spit the parasites into you and suck blood from you. That is why it is important to use nets to avoid mosquito bites.

Similar biomedical explanation of the cause and transmission of malaria were reported by the other participants.

Chaona: In my understanding the main cause of malaria, obviously if we take it from the academic point of view, is Plasmodium parasites which are spread by Anopheles mosquito. But here in the village, many people do not know precisely what causes malaria because they think malaria is anything that causes fever. If one has fever, they may call that as malaria. If they go to the hospital they may say I am suffering from malaria because I have chill, my body temperature is high. So some people in the communities do not know what exactly causes malaria. Others however, say it is mosquito itself that causes malaria, not Plasmodium falciparum.

Malaria being a disease of local importance is a well known disease; the primary Health Education and the

Table 1. Background characteristics of research participants.

Characteristics	Afana	Asante	Gwetsani	Tinkanena	Ipenza	Chaona	Dambwa
Sex	M	M	M	F	F	F	M
Age	30	40	32	43	28	38	>50
Qualification	MSCE ^a	MSCE	MSCE	MSCE	MSCE	MSCE	Postgraduate
Professional Training	HAS ^b	AEHO ^c	AEHO	HSA	AEHO	HSA	Public Health
Length of training	11 wks	3 yrs	3 yrs	11 wks	3 yrs	8 wks	6 yrs
Professional Training	HSA	AEHO	AEHO	HSA	AEHO	HSA	Public Health
Working for	MOH ^d	MOH	MOH	MOH	MOH	MOH	Intern. NGO
Years worked	4	16	6	7	2	10	>10

^a Malawi School Certificate of Education; ^b Health Surveillance Assistant; ^c Assistant Environmental Health Officer;

^d Ministry of Health.

MSCE Biology syllabus has topics which deal with malaria. It is therefore expected that after completion of MSCE level education one is conversant with malaria and other diseases of local importance.

3.2.2 Beliefs about traditional medicine in malaria prevention and treatment

Although the participants were trained in biomedical concepts of disease causation and prevention they also believed in traditional methods of prevention or control. The reason that came out prominently for this was the belief that traditional remedies are considered more effective than modern medicine as explained by Afana below.

Afana: For anaemia secondary to malaria, we give children iron tablets to help them have more blood. Also if the child is my relative or my closest friend I advise them to try leaves from pear tree, they are good at increasing blood levels. Taking a teaspoon of water from boiled pear leaves three times a day is very effective than the tablets.

Interviewer: Why do you only tell your closer relative or friends about leaves from pear tree for increasing blood level?

Afana: You know we are not allowed to tell patients about traditional or herbal medicine, but I know these ones work so I can tell my friends or relatives about that. There is no problem. Even apples are very good for blood formations, and in biology it is recommended that patients suffering from anaemia needs to eat at least two apples a day.

Afana mentioned spontaneously his belief about how effective leaves of pear tree or apple fruits are in controlling anaemia secondary to malaria. His reasoning

seemed to stem from his biological knowledge where fruits like apples and pears are recommended as natural remedies for anaemia. While pear leaves are boiled and the supernatant taken three times a day similar to other traditional concoctions, an apple fruit cannot be considered as traditional concoction but rather natural remedy. Its effectiveness in preventing or controlling anaemia has been well documented [18].

Gwetsani describes his own experience of using traditional malaria interventions:

Gwetsani: We use some shrubs; in Chichewa we call them mpungabwi. What happens with this shrub is that we spread the leaves in the house and sometimes we smear the leaves on the skin. When the mosquito catches the smell of that shrub it goes away, it is repelled.

Interviewer: Have you tried this traditional method yourself as an individual?

Gwetsani: Several times, several times; more especially when I go to visit my mom in the village I normally do that.

Gwetsani indicated to use traditional methods when he visited his mother in the village. However, he revealed no conflict between his belief in using traditional interventions and his professional knowledge as described in the extract below.

Gwetsani: I have grown up in the community and I have used some traditional practices of malaria prevention and control in the community. Now I have come to realise that the scientific knowledge gained from my professional training and the knowledge I gained from the

local community complements each other. Therefore, I have realised that the experience I have of using shrubs as mosquito repellents complements well with my professional knowledge.

Similarly, other participants also expressed how they benefitted using traditional methods of malaria control:

Tinkanena: In the communities we have a lot of traditional methods. One of which is using dung of cattle or goats, burn them and the smoke is used to repel mosquito away. Some people believe in using tree leaves and some shrubs like mpungabwi. I personally prefer to use the herbs than burnt dung in my household and it is very effective in driving away mosquitoes.

There appeared a tendency among the participants that much as they were trained in biomedicine on the causes and prevention of malaria, they still considered local preventive measures to be (at least partially) effective.

3.3 Barriers to malaria interventions at community level

Participants perceived the following as barriers or challenges to the implementation of malaria interventions at the community level.

3.3.1 Community's beliefs about causes of malaria

The perceived cause and transmission of malaria may influence how individuals seek malaria interventions, and the type of interventions they use. As noted below, local communities have internalised different beliefs about what causes malaria. These beliefs vary based on the type of community and level of literacy, as described below:

Afana: Well, in the community I am serving the level of literacy is not very low as the case may be in far away villages. The common perception is that every febrile-like illness is malaria. Most of them do not really have the understanding as to what predisposes to malaria. Once somebody feels like fever, nausea and lack of appetite it is malaria. The only other thing is that they know mosquitoes are associated with malaria but a good number can't explain how. They are able to tell that mosquitoes bite me and something in mosquito saliva causes malaria.

However, some members of the community still believe in some non-biomedical causes of malaria.

Tinkanena: At least as a child, I knew that my grandma attributed playing in the rain as a cause of malaria. So

when we played football in the rain, she would come out and flog me because she thought I was going to get malaria. Also, amongst some people in this community, they believe that exposure to rain or staying under the sun for prolonged period of time for whatever reason you may get malaria.

Despite this departure from biomedical causes of malaria, local communities still associated malaria indirectly (rain) with the presence of mosquitoes.

Asante: If you are talking of the very remote areas, some of them believe that malaria is caused by mosquito but they don't know what exactly in the mosquito causes malaria. Others will tell you that malaria is caused by eating sugarcane, especially the small tender ones.

Chaona: Like in the community where I work, they believe that malaria is caused by mosquitoes. Some believe that malaria is caused by eating sugarcane.

Gwetsani: Some believe that, during the time when we have green maize, when you eat a stem of green maize you will get malaria; the community believes that the stem is a cause of malaria. I can give you the vernacular name of the maize stems; they are called 'misinde'.

Interviewer: Why do they believe like this?

Gwetsani: I heard that they believe in that because in the maize fields there are a lot of mosquitoes. Some people say some of those mosquitoes inject bad fluids in those 'misinde'.

3.3.2 Community's beliefs and lack of knowledge about susceptibility to malaria

Another main challenge to effective malaria interventions stems from the lack of knowledge and understanding about selective susceptibility to malaria infections. Because immunity to malaria is acquired with repeated exposure, adults are generally semi-immune. However, pregnant women become susceptible to malaria because the placenta provides a new niche for parasites sequestration providing a suitable environment for survival of parasites thereby evading splenic clearance mechanisms [19]. This makes pregnant women and under-five children who have not fully developed immunity to be selectively susceptible to malaria. Because of this knowledge gap it was reported that some men do not believe that malaria is spread by mosquitoes, let alone can be prevented by ITNs.

Afana: Most people along the lakeshore depend on fishing for their livelihood. So it is men who exclusively

get involved in fishing while women do domestic chores. These fishermen stay overnight on the lake fishing using locally made boats; during this period they are heavily bitten by mosquitoes and yet they do not get ill of malaria. But pregnant women and children who receive free nets to protect themselves from mosquito bites are still the ones who suffer from malaria. So because of this some people along the lakeshore do not believe that malaria is transmitted by mosquitoes.

All the participants agreed that this knowledge gap generally affects communities living along the lakeshores and river basins. As a result of this, it was reported that some men resort to use the freely distributed ITNs for fishing:

Tinkanena: But if we can talk about men who live along the lakeshore and are exposed to mosquito bites but not vulnerable to malaria. They do not use mosquito nets and yet they do not frequently suffer from malaria. Instead they think that the best way to use mosquito nets is to use them for fishing.

This problem is compounded by traditions and culture of Malawian families as identified in the extract below:

Asante: In our culture, the man is the head of the family and it is the man who is a breadwinner. So if the man says I should take the net for fishing and the woman knows that is where their food will come from, what do you think this woman can do?

3.4 Community's beliefs about ITNs

Although ITNs have been scientifically proven to reduce malaria-related morbidity and mortality, their coverage and usage remains low even where distribution is free. There are some beliefs that act as barriers to use ITNs for malaria prevention:

Chaona: Some say we want them to use mosquito nets to prevent them from bearing children. It is like contraceptives which government is trying to use to run away from the truth that it is contraceptives. But then other people say use of mosquito nets makes them inactive at night especially men.

Asante: With these free ITNs, since they are treated with chemicals, people say that the chemicals that are used to repel mosquitoes can make them sterile. They say it is Government's plan to make people sterile as a form of family planning. As a result they don't use them, they just store them.

Ipenza: I have heard that when some people use nets, they suffocate while sleeping. Some married people complain saying that they do not perform well in their sexual activities if using nets. They say that the chemicals or the drug, which is used for treating nets, is what actually makes men to be dormant and not sexually active, leading to less and less sexual contacts. Another belief is that since sexual activities are not being performed within the house, so they believe that it is like family planning method. So as a result you find out that though people are receiving nets but they are not using them because they are not interested in family planning. So that is why they resort to traditional methods of malaria control.

The beliefs about ITNs causing infertility or other reproductive disorders have also been reported elsewhere. For example, in Mukono district, Uganda few pregnant women reportedly use ITNs due to the belief that the chemicals used to impregnate nets have dangerous effects on pregnancy and the foetus due to its repellent action against mosquitoes [20].

3.5 Health workers' assimilation of community's culture and traditions

Another problem affecting service delivery and implementation of conventional interventions relates to the community's culture and traditions that are assimilated by health workers over time. This was identified as one of the challenges participants faced in discharging their duties in malaria prevention and control.

Tinkanena: To be sincere, sometimes it is difficult to advise members of the community adequately on proper usage of conventional interventions. You have to understand that even though I am a health worker I am also a member of the community and therefore I also use traditional methods of intervention at times. So even though I advise members of my community to use ITNs for instance, but those who know that I prefer to use mpungabwi as a traditional repellent would still doubt the effectiveness of ITNs.

Interviewer: Why do you prefer to use traditional repellent rather than ITNs?

Tinkanena: I have been using mpungabwi since childhood and I believe it is more effective than ITNs. Mpungabwi is a natural herb which is scientifically proven to repel mosquitoes but the communities may not understand this and just insist that I use traditional remedies. Sometimes ITNs are difficult to place on beds and any puncture on the net allows mosquitoes to go through freely and one still

gets bitten; but the ability of herbs like mpungabwi to repel mosquitoes is unaffected.

Chaona: You have to remember that when you are talking of clearing mosquito breeding sites, I will have to do it myself. Sometimes it is difficult because mosquito breeding sites pop up during the rainy season when I am equally busy with farming activities in addition to my job as a HSA. The other reason is that even we HSAs are community-based. We become part of the community, and in the process we inherit the habits of the community. So it becomes difficult for us HSAs to encourage members of the community to follow conventional methods of prevention, which we as health workers are failing to adopt.

Similar responses were also obtained from the other health workers on how they become acculturated to the traditions of the communities they work in. This is particularly the case with HSAs who work full time in the community they are part of. This could probably be because they would like to maintain their relationships with members of the community so that they are accepted and identified as bona fide members of that community. It could also be because the participants themselves believed in the effectiveness of the traditional methods of malaria prevention and control. This may create difficulties for the health workers to propagate the conventional and scientifically proven malaria interventions.

While the other participants indicated that they practiced traditional malaria interventions based on scientific knowledge, Chaona's reasoning as to why they fail to encourage local communities to clear mosquito breeding sites in their surroundings sounds contrary to their own professional training where health workers are expected to live by example. Health workers command a lot of respect [12] and if they clear their own surrounding, removing stagnant water and other potential mosquito breeding sites as one way of malaria prevention and control, members of the local community are likely to follow suit.

3.6 Promotion of conventional interventions

The participants' opinions on what could be done to minimise the challenges and barriers to effective malaria interventions were solicited. All participants believed there was a need to adequately educate communities on the causes of malaria and how the spread of malaria can be prevented. The extracts below demonstrate the importance of education as explained by Afana and Tinkanena:

Afana: What I think is the most important thing to do is to civic educate the community on the dangers of

malaria. If people are properly orientated and then tell them why they should use nets, cut long grasses, or clear stagnant water around their surrounding, malaria infections can be eliminated. In the absence of civic education malaria will still be there.

Tinkanena: We need to educate the communities on proper use of malaria interventions. The problem here is like this; insecticide-treated nets are accessed from health facilities for free and therefore the education only goes to mothers attending antenatal clinics and yet these nets are also used by the husbands who do not know how the nets are supposed to be used. So this becomes a challenge, which needs to be addressed by educating all members of the local communities.

Chaona also acknowledged the importance of educating the community about malaria interventions as indicated in the extract below. However, she believed there was need to do more than education. She recommended that there should be a more participatory approach in designing and delivering malaria interventions at the community level. She also believed that communities needed to be empowered and made aware of the interventions well before the intervention is brought into the community.

Chaona: The best way here is to educate the people. The people have to be educated on the use of conventional interventions and the disadvantages of using traditional measures. Then at the same time, the community should be involved. People should not just bring the interventions for the community to start using them; they should be involved on how the interventions came about. They have to do that through their local leaders because these will be in a position to convince the community about the interventions. Other than that it will be difficult because of issues of misconceptions. And if the misconceptions comes from their local leaders do not expect them to use the conventional intervention methods.

In line with Chaona's suggestions, Gwetsani explained why and how empowerment and a more participatory approach could be incorporated for effective delivery of malaria interventions:

Gwetsani: The approach which I have in mind, because we have already tried this IEC (Information health Education and Communication) to the community but it seems some people in the community are not following it, so I have an opinion that if we can establish some groups in the communities so that we should impart enough knowledge in those groups and in return these groups should try to explain to their friends in the communities by

giving examples like demonstrations. Maybe that can work. The other method that I also have in mind is to use the local leaders or chiefs. If we negotiate with the chiefs so that they can introduce some penalties to those who don't have nets in their communities or in their village, then I think that approach can also work. Because the people will be afraid of their chiefs and then they will buy nets and start using them.

The participatory approach can be enhanced by formation of community-based organisations (CBO). Through these CBO, qualified members of the local community can be trained and mandated to teach others on causes, transmission, prevention and control of malaria. Gwetsani's idea of using chiefs and local leaders in encouraging malaria control interventions reflects the respect they command in their communities. However, community-based penalties would better be directed at households not clearing mosquito breeding places surrounding their homes, which requires legislative effort for it to be effective in the long run.

The participants seemed to appreciate the need to educate the communities and involve them in the decision making process; this is in line with the principles of health promotion for success in achieving change [21]. On the other hand, there seems to be a contrasting opinion from policy makers and funding agencies as shown in extract below.

Interviewer: [...] do we include some members of the community to be part of the decision making process in malaria interventions as they are the end users of the interventions?

Dambwa: Aaaa... not really, I mean some KAP survey is going on but more of these decisions are based on really scientific figures. I think some of these decisions may not require community participation but what is important on that is how the scientifically-proven intervention could be adopted by the community. This is the most important aspect. For example like the use of nets. Nets are proven to reduce malaria mortality and it is established fact. I mean you don't need to discuss with the community on that. What is important is how to convince an individual or household to consistently use nets.

Currently, Malawi is moving towards free universal net coverage [22]. However, before this free net distribution is rolled out, there is need to challenge the beliefs and perceptions about the use of nets as a malaria intervention. Otherwise the barriers to nets use may outweigh the benefits of this free net distribution.

4 Discussion

This study identified a number of issues that health workers cited as barriers and challenges to effective delivery and utilisation of malaria interventions in Lilongwe. These related to health workers' assimilation of community's beliefs and traditions; beliefs about causes of malaria contrary to known biomedical causes; beliefs about traditional methods of malaria prevention and treatment; beliefs about insecticide-treated nets (ITNs) as a cause of infertility among married couples; and lack of understanding about selective susceptibility to malaria infections.

The beliefs identified above have also been reported in other studies from sub-Saharan Africa. However, assimilation of community's beliefs and traditions by health workers seem to be an emerging (new) factor affecting the implementation of malaria interventions at community level in Lilongwe. This adoption of behaviour patterns and assimilation of the culture in which one lives is called acculturation [23]. Health workers also become acculturated to western medicine following the influence of western education during their academic and professional training. Individual community health worker's behaviour on malaria prevention and control may also be influenced by the culture in which they grow up from childhood a phenomenon called enculturation [23, 24]. Thus, their behaviour in malaria prevention and control is a product of both enculturation and acculturation processes that is, their original beliefs about malaria prevention, their knowledge acquired as a result of training and the beliefs they assimilate in the communities they work and live in. However, these health workers need to be exemplary in line with their professional training for the effective delivery of malaria interventions at community level.

There appears a tendency among local communities to believe in the association between mosquitoes and malaria infections either through actual mosquito bites or otherwise. The belief that mosquitoes carry the causative agents of malaria, which they inject into tender sugarcane or green maize stalks, and subsequently infect humans during consumption is what Green refers to as 'indigenous theory of contagious disease' [25]. Fields of maize, rice and sugarcane are known to act as resting or breeding places of mosquitoes [26] and the presence of the human host in these fields affords mosquitoes a readily available source of blood. This concept, however, seemed lacking in most communities and therefore facilitated the belief that it is actually consumption of bad fluids injected in maize stalks or sugarcane that caused malaria. The implication of this belief is that local communities are unlikely to use malaria interventions that directly reduce mosquito bites.

The association between the presence of mosquitoes and malaria can also be explained by the type of traditional

interventions local communities use, most of which are targeted at either repelling or killing mosquitoes. It has been reported in this study that local communities in Lilongwe use burnt cow dung or shrubs popularly known as 'mpungabwi' to repel mosquitoes from homes. Scientific evidence has emerged that burning of plant material and cow dung and use of other plants are effective in repelling mosquitoes [27-29]. Although this suggests that people believe that mosquitoes spread malaria such measures may also be deployed as a means to reduce the biting of nuisance mosquitoes that are often more abundant. These botanical repellents are safe to use, readily available and biodegradable which is favourable over the use of synthetic compounds [30]. Mpungabwi, scientifically known as *Ocimum americanum L.* is a widely used natural mosquito repellent and can either be used topically, burnt or smouldered, or placed on doorway or windows. It is widely used in Malawi and other African countries like Kenya where ethnobotanical surveys revealed that 64.1% of people in Western Kenya [31, 32] use it to repel mosquitoes; a similar proportion (60%) of the population does so in Malawi [33].

Based on the documented effectiveness of using these natural repellents and the fact that around two-thirds of Malawians use them [33], it wouldn't make sense to discourage local communities from using these natural products for malaria prevention. However, because malaria infections need to be tackled on all fronts, an incorporation of conventional interventions into locally available interventions and sufficient education on how both interventions work to protect individuals from malaria will likely be a more acceptable and effective approach and will be viewed as cultural synthesis [21]. Further research to help incorporate these natural products into user-friendly interventions may form a better collaboration with the communities on malaria prevention and control.

The beliefs about insecticide-treated nets (ITNs) also require serious attention for effective delivery and utilisation of this malaria intervention. ITNs were associated with infertility. Because of the repellent effect caused by the pyrethroids used to treat ITNs, people can sleep without mosquito disturbance, which may reduce the frequency of sexual contacts. It has been reported that most parents in Lilongwe and the rest of Malawi share sleeping space with children and have sexual activity when the children are sleeping. In the absence of mosquito disturbance that keeps parents awake they tend to lose that period of privacy. As a result, sexual activity is postponed prompting local people to think that the government is distributing ITNs for free as a family planning method. This brings in a fallacy of ecological correlation [21] where people relate reduced sexual activity as a result of peaceful sleep due to lack of mosquito bites to sexual dormancy caused by chemicals used to treat nets. Because reduced sexual activity can lead

to reduced level of conceptions in families, local communities have further correlated chemicals used to impregnate nets as contraceptives. In view of this ecological correlation it is not enough to advise communities that association of infertility and ITNs is a myth. Rather it is imperative to educate them where this association comes from. The consequence of this belief is that even though people receive free nets, they may not use these as they are not interested in family planning thought to be secretly instituted by the government. Again, in areas where nets are important in other activities like fishing or erecting fences for vegetable gardens, local people will tend to divert these nets for that purpose.

The Health Belief Model [34] helps to understand how beliefs about causes of malaria may lead to alternative uses of malaria interventions like ITNs. First, a person must feel susceptible to malaria and threatened with perceived serious consequences. Secondly, the person must believe that the benefits of interventions like ITNs outweigh the perceived barriers to consumption of that intervention. Perceived susceptibility, perceived severity, perceived benefits and perceived barriers form the four main constructs derived from this model [34]. The consequences of malaria in pregnancy, for example, are largely affecting the unborn rather than the pregnant woman making the barriers to intermittent preventive treatment in pregnancy stronger than the benefits, especially to less educated mothers. Similarly, fishermen do not feel susceptible to malaria despite their vulnerability to mosquito bites all night long while fishing on the lake. They are therefore not threatened with perceived serious consequences of malaria infections. This means that their beliefs on the benefits of using nets when sleeping do not outweigh the perceived barriers to use of the intervention. As a result, these fishermen would rather use these freely available nets for fishing. This area also requires health education to ensure that communities have adequate knowledge on selective susceptibility to malaria infections by pregnant women and young children.

Malawi is currently moving towards a policy of universal net coverage. Defined as one net for every two people, the Government of Malawi with support from international donors like United States Aid for International Development (USAID) intends to distribute free long lasting insecticide-treated nets (LLINs) as one way to control malaria-related morbidity and mortality. This new strategy sets a goal of 90% coverage of LLINs by 2015 [22]. In the presence of such strong beliefs about ITNs/LLINs causing infertility, the impact of universal net coverage is likely going to be limited, *i.e.* coverage will not match effective use. Therefore, immediate attention to provide adequate education to the communities in collaboration with local leaders, chiefs, leaders of faith organisations and traditional medical practitioners is essential before universal net distribution is

attained.

In order to promote conventional interventions, the health workers suggested a participatory approach and community empowerment in designing and delivering of malaria interventions. The aspect of community participation as suggested by the health workers indicated that in most cases interventions are designed and delivered at community level with little or no input and participation from the community. Especially those members of the community who may not be willing to adopt such interventions, probably because of knowledge gaps, may perceive this as 'cultural invasion'. Where targeted populations feel their culture is invaded, there will be less adoption or incorporation of the intervention in their social system [21]. Most interventions are already being implemented but can be improved over time so that full community participation can be taken into account. This will be in line with the planning process in the health promotion model that uses the principles of participation, which state that success in achieving change is enhanced by the active participation of the target population in defining their own high priority problems and goals as well as the development and implementation of the solutions to their problems [21].

Community empowerment through education and the formation of community-based organisations (CBO) can also help improve effective delivery and utilisation of malaria interventions. As defined by Laverack, community empowerment is a process by which communities gain more control over the decisions and resources that influence their lives, including determinants of health [35]. Through CBO, members of the local communities, who are well respected and have leadership qualities, can be trained on causes, transmission, prevention and control of malaria. These in turn will be expected to teach the rest of their communities on malaria control and interventions. The trained local members can also help facilitate dialogue between local leaders and implementers of malaria interventions.

Community empowerment also needs to include educating the communities on the economical implications of malaria. While it is appreciated that most of the local people are poor and invest much of their time in farming activity, ignoring environmental management would mean continued breeding of malaria vectors and therefore sustained transmission. Inevitably, this may lead to indirect losses in productivity, because adults may be either ill themselves or taking care of ill children due to malaria resulting in loss of valuable time for subsistence farming or other income generating activities [4]. Consequently, this may exert a high toll on household welfare as these may be forced to sell their assets or go into debt in order to meet the cost of food, transportation to hospital and other basic needs following hospitalisation of sick family members.

The main limitation of this study is its generalisabil-

ity. In-depth interviews are usually time consuming and therefore a limited set of objectives was considered, which helped us to reach saturation of views having interviewed a small sample of participants. Nevertheless, critical baseline information to assess the success of malaria interventions was provided in this study and underscores the need to facilitate large studies of this nature across the country in order to critically determine barriers that impede effective delivery and utilisation of malaria interventions and incorporate the same in health promotion activities to increase interventions' uptake.

5 Conclusions

This study, in part, provides an insight as to why malaria continues to be a major public health problem in Lilongwe, Malawi. Community members, because of different beliefs and perceptions, do not effectively employ contemporary interventions. These beliefs and perceptions can be addressed by incorporating health promotion strategies in designing, delivering and implementing interventions to ensure that communities are empowered to take decisions regarding their health. Unless these beliefs are challenged and local communities are empowered in deciding their priority problems and interventions to use, universal net coverage may not be achieved and more funding will continue to be channelled towards malaria interventions with limited impact. We showed that beliefs and perception about malaria interventions are beyond myths as communities associate such beliefs with ecological outcomes. It is therefore necessary to ensure that health education on ITNs and other interventions include adequate information on how myths surrounding malaria interventions evolved. Further qualitative and quantitative research with a larger sample size is needed to explore these beliefs and perceptions about malaria interventions especially now that Malawi is planning to roll out free universal net distribution.

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