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Full Length Research Paper

Practice and prospects of indigenous homestead based approaches to prevention of malaria; a case study of a high malaria transmission area in Uganda

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Environmental sanitation and indigenous practices based on homestead characteristics have not been emphasized in national malaria control strategies. This study explored homestead characteristics, housing attributes, indigenous practices and knowledge of malaria in a rural high malaria transmission community in Uganda. Structured interviews and direct observations of housing attribute and homestead characteristics were carried out in 100 randomly selected homesteads in Kaliro District, Uganda. Plants believed to be mosquito repellants were observed in a number of homesteads and most respondents correctly described malaria symptoms. Almost all homesteads (99%) had large crops grown around them and were close to kraals (within 50 m, 88%). A number of homesteads were in easy reach of un-protected water springs (49%), 32% had material that could harbour mosquitoes (e.g. tins or ditches). The community had good knowledge of malaria and its prevention. Homesteads had modifications aimed at reducing malaria transmission. Despite this knowledge, the environment of most homesteads was conducive for the survival and faster multiplication of malaria vectors and this collaborates with the high prevalence of malaria found in the study area. There is need to develop and pilot interventions focusing on modifications of homestead characteristics and housing attributes for sustainable control of malaria.

Key words: Malaria, indigenous, homestead, prevention.

INTRODUCTION

The Uganda National Malaria Strategic Plan 2005-2010 provides for the case management of malaria as the corner stone for malaria control in the country. Specifically Artemisinin Combination Therapy is the recommended treatment of choice (Uganda National Malaria Strategic Plan 2005). On the aspect of malaria prevention, the use of insecticide treated nets and indoor residue spraying are emphasized. However, malaria control from the perspective of homestead environmental sanitation is less, if not at all, emphasized.

Globally, there has been reasonable commitment of resources to the fight against malaria Global Malaria action plan (2010). The outstanding initiatives include the Global fund for malaria, TB and HIV, the Gates Foundation and a number of national initiatives in the respective countries. All these resources have been used to implement strategies exotic to malaria endemic communities. While progress has been registered, we note that some of the strategies have not been fully accepted, while others are not affordable by the communities that need them and this raises serious sustainability questions (Daddi et al., 2005; Obinna and Kara, 2004).

A number of traditional approaches of controlling malaria are known and have been practiced by communities living in malaria endemic zones yet none of

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them have been investigated to establish their effectiveness in malaria control. This study was carried out with the aim of documenting traditional methods of controlling malaria in Uganda that can be validated and subsequently incorporated into the National Malaria Control Program. The specific objectives of the study were to document traditional knowledge including practices and beliefs about the causes, transmission, symptoms, recognition, treatment, prevention and control of malaria. This pilot study was carried out in Bulamogi County. It is expected that the outcomes of this study will be used to guide a large scale national survey of the indigenous methods used in controlling malaria most of which are yet to be documented as well as validated.

METHODS

Study site

Bulamogi County (recently upgraded to Kaliro District) is found on the shores of L. Kyoga, an area of high malaria transmission. The county is made up of five sub-counties, namely Bumanya, Gadumire, Namugongo, Namwiwa and Nawaikoke. The sub-counties are subdivided into parishes and the parishes into villages. The district lies between 33°20' to 33°38'E and 0°58' to 1°18'N at an altitude of 1052 to 1098 m asl (Uganda Government, 1963). Its vegetation includes savanna-woodlands and swamps. It has a total population estimated at about 155, 000 people (UBoS, 2005) and a population density of 180 people per sq. km. The population has a 50-50 gender balance.

Study design

This was a cross-sectional survey of homestead characteristics and housing attributes in which focus group discussions, structured interviews and direct observations were used to document traditional knowledge, practices and beliefs of malaria control.

Sampling methods

The sample size was determined on the basis of desired precision of the estimate and expected frequency of traditional knowledge, practice and control of malaria. It was assumed that at least 50% of the local population possessed good knowledge about the factors influencing malaria spread and control. The sample size was selected to ensure a level of confidence of 95% and an absolute error of 10%. Using the table of sample sizes in Thrusfield, 1995, a sample size of 96 was attained.

The individual respondents in a given sub-county and parish were selected using the proportion random stratified sampling procedure. The sub-county was taken as the main stratum. The number of respondents to interview in a sub-county was determined by dividing the sub-county population with the county population and multiplying by 96. The number of interviewees in each parish was determined in a similar manner, that is, by dividing the parish population by the sub-county population and multiplying by the predetermined sub-county sample size. A number of villages corresponding to the parish sample size were randomly selected using a table of random numbers. A village household list was created with the help of an executive member of the local village council. From this list one household was randomly selected. The oldest member of the household was requested to participate in the study and was interviewed. If for any reason it was not possible to conduct an interview in a household; a neighbouring household was then selected. It was assumed that gender was a key factor influencing traditional knowledge about malaria, and as a result samples were selected with a gender balance of 50%.

Focus group discussions and Interviews

Focus group discussions, with between five and nine participants, were conducted in three sub-counties namely Gadumire, Bumanya and Nawaikoke. These discussions were conducted following a checklist of questions. In each sub-county two focus group discussions were held; one with opinion leaders and elders and another one with Traditional Medicine Practitioners (TMPs).

Data from the group discussions were analyzed and used to design a guided questionnaire of open and close ended questions which was used in a general survey. The questionnaire was pre-tested for feasibility and clarity. Thereafter it was administered by members of the study team to randomly selected respondents. It was administered in Lulamogi, the local language spoken in the study area. The interview questions included questions on respondent demographic and social characteristics, ecological conditions that favor breeding and survival of mosquitoes, community's understanding of the causes and spread of malaria, health seeking behavior, methods of malaria prevention and treatment. Other questions were aimed at documenting material used to protect the community against mosquito bites.

The interviews were complemented with structured direct observations of housing and homestead attributes: type of crops grown near homesteads, respondents' visual estimates of distance of homesteads from Kraal or gardens, availability of water pools in homes; respondents' visual estimates of distance of natural water bodies from homesteads, availability of natural repellants in homestead. Plants mentioned in the interviews and discussions were directly identified in the field by an ethnobotanist on the research team who had previously made plant collections in the study area.

Data analysis

Data from focus group discussions were analyzed and responses grouped into classes according to similarity of information. Data from the questionnaire were edited for consistency and summarized in the form of means and percentages using the software SPSS for windows release.

Ethical considerations

Ethical approval for this study was given by the National Council of Science and Technology (Ref. MV 799). The research objectives and methods were explained to respondents and oral informed consent obtained from them before the research instrument was administered.

RESULTS

Respondent's social-demographic characteristics

Respondents interviewed in this study had an average age of 30 years (mode). The majority had attained formal education; a high proportion had not attained higher than primary level education (56%) (Table 1). Their major

Table 1. Respondents socio-demographic characteristics (n = 94).

Education	%
Primary level	56
Secondary level	22
None	22
Primary source of livelihood	
Subsistence Farming	86
Teaching	1
Trader	3
Student	6
Petty trade	2
Other	1
TMP	1

Table 2. When was the last time you fell sick from malaria?

	Percent (%)
Currently suffering	21.9
2 days	1.0
3 days ago	2.0
4 days	1.0
week	13.5
2 weeks	4.2
3 weeks	3.1
month	22.9
2 month	7.3
3 month	5.2
4 month	4.2
5 month	3.1
6 month	3.1
8 month	1.0
10 month	1.0
1 year	3.1

source of livelihood was farming (85%).

Local understanding of causes, transmission, recognition and prevention of malaria

The respondents stated the common malaria symptoms. The symptoms reported included raised body temperature, pain and joint pains, headache, vomiting and abdominal pain. The respondents had good awareness of malaria causing factors. They were aware that mosquitoes carry the malaria parasites. However, they also associated malaria with poor hygienic practices, cold weather and the eating of mangoes. All respondents knew about the use of mosquito nets as a national strategy for prevention of malaria, although only 10% had a mosquito net at home. The other prevention methods reported included spraying with insecticides and clearing bushes around homesteads.

On average, respondents reported that they experienced episodes of malaria nine times a year. Twenty-two percent of the respondents had symptoms of malaria at the time of the study, and a further 17.5% had experienced an episode of malaria in the week preceding the study (Table 2).

Table 3. Materials used for construction of houses in Kaliro District.

Material	%
Floor material (n = 96)	
Earth	88.5
Concrete	11.5
Roofing material (n = 96)	
Grasses	43
Iron sheets	57
Outer wall material (n = 60)	
Mud	27
Cement	10
Brick	63
Windows (n = 94)	
Wood	96
Bricks	2
Open	1
Glass	1

Homestead practices related to malaria prevention

Most homesteads had plants reported to be mosquito repellants around or near the house. Most houses were made from materials that form good habitat for mosquito breeding (Table 3).

Nearly all homes (99%) had large crops (e.g. maize) grown around them and were close to kraals (within 50 m, 88%). Furthermore they were in easy reach of un-protected water springs (49%). A number of homesteads (32%) had areas suitable for faster multiplication of mosquitoes (e.g. tins, pits) and were close to natural water bodies such as rivers, streams or lakes (36%) (Table 4).

DISCUSSION

In this study we found out that the people of Kaliro

Table 4. Ecological determinants for mosquito breeding and survival.

Size of crops grown near homesteads (n = 93)	Percent (%)
Large crops	99
Small crops	1
Distance of homes from krall (n = 89)	
Within 50 m	88
500 m	10
1 km	1
> 1 km	1
Material and conditions favoring mosquito breeding (n=93)	
Present	32
Absent	68
Distance from natural water body (n = 96)	
500 m	18
1 km	18
> 1 km	65
Distance of homestead away from un protected springs (n = 96)	
500 m	48
1 km	28
> 1 km	23
200 m	1

For each variable the number of respondents who answered the question is indicated in parenthesis.

District, a rural part of Uganda with high malaria incidence had relatively accurate knowledge on the causes and symptoms of malaria. The study further revealed that the incidence of malaria was high, with one out of every four people reporting they were suffering from malaria at the time of the study. This study provides evidence that there was limited access to the recommended malaria prevention approaches by this community. The use of mosquito nets as advocated by national malaria control program was particularly not effective in this community and this may apply to most rural communities in malaria endemic countries. This study further indicates that indigenous beliefs and practices such as the use of mosquito repellant plants are widely practiced.

The apparent inadequacy of strategies so far implemented by the national malaria control programs suggests that emphasis should be extended to other options. Chemotherapy and in-door residue-spraying using dichlorodiphenyltrichloroethane (DDT) are among the options currently used (as per strategic plan) but each of these options has faced unique challenges. Chemotherapeutic treatment has been in use for several years but the challenge of increasing drug resistance of the malaria parasite has inhibited its success (Alecrim et al., 1999). The resistance of the parasite to chemotherapy explains the gradual change of first line treatment regimen from chloroquine (before 2000) to a combination of chloroquine and sulfadoxine-pyremethamine (2000 to 2007) and currently to artemisinin-based combination therapy (2008) (Ministry of Health, Uganda 2008).

Indoor residual spraying using DDT has currently been so far on small scale but with intention for full-scale use in many areas across Uganda. However, the use of DDT, despite support from some reputable agencies, has received resistance through lobbying from environment advocacy groups such as Uganda National Association of Professional Environmentalists (NAPE) and other international environmental conservation organizations (Pesticide Action Network International, PAN, 2007). Local environmentalists have protested the use of DDT on the basis of its known long persistence in the environment (Oweyegha-Afunaduula, 2005; PAN, 2007). The use of DDT has not been fully supported by the National Organic Agricultural Movement of Uganda (Nogamu) either (Daily Monitor July 19 2006). Circumstances seem to indicate that this approach may

not be sustainable in the long run. These events raise concerns as to whether malaria endemic communities would hold onto the successes that have been registered so far.

The results of this study suggest that approaches towards improving environmental sanitation around homesteads have a high malaria control potential as they are acceptable and better understood by communitities in malaria endemic areas. Many of these approaches are not properly documented and there is need to commit more resources to the identification, piloting and promotion of interventions modifying homestead attributes that favour malaria transmission.

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